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Contractors *and* Engineers Monthly

Vol. 48, No. 6

JUNE, 1951

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Covering the Field

● How to Get the Public's Ear

Try plain talk; don't overwhelm John Q. with statistics. Show him what good roads will save him. Page 3 suggests how.

● Building Construction

Bad foundation conditions bedevil a contractor on a 13-story building. Page 5.
F. H. McGraw builds an 11-building coal-processing plant. Story, page 97.

● Dozer Saw Speeds Clearing

Cuts 15-inch trees in one pass—and cuts cuts—at Boysen Reservoir. Page 9.

● Traffic Engineers and Defense

Page 14 tells how Massachusetts engineers have mapped evacuation routes and established traffic control stations.

● Concrete Paves City Approach

A dual RC highway replaces a narrow 3-lane city approach. See page 17.

● Reservoir for Pasadena

The concrete-lined reservoir (page 22) will store 50,000,000 gallons of water.

● Air Photos Pay Off

Mississippi saved time and money by using aerial photogrammetry. Page 26.

● Asphalt Lines Canal

USBR tries a buried asphaltic membrane for low-cost seepage control. Page 28.

● Bituminous Paving

Specialized rigs speed widening and asphaltic-concrete surfacing. Page 33.
A Vermont secondary road gets a blacktopout of the contract covered on page 56.

● Airport Upkeep

A maintenance force of 53 keeps Denver's airport tip-top. Page 39 tells how.

● Chesapeake Bay Is Bridged

Eight contractors work on the \$40,000,- 435-mile bridge. Will complete it in 1952. Pix and story on page 44.

● Grading in the Rockies

A 550,000-cubic-yard job is last grading work on U. S. 40 realignment. Page 60.

● Mr. Road Commissioner

San Bernardino County's commissioner advises county engineers to be objective, enthusiastic, practical. Page 65.

● Roadsides Reviewed

Two courses brief highway and landscape designers on ends and means. Page 71.

● Spring Means Maintenance

Kansas times bituminous maintenance between last thaw and first rain. Page 75.

● Safety on All Levels

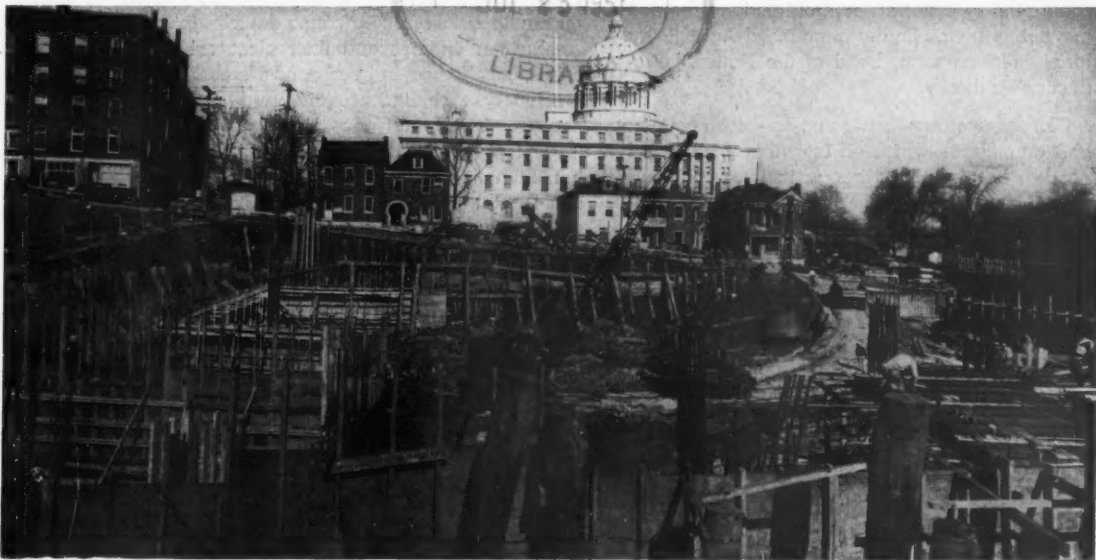
Safety practices above and below ground detailed at N. Y. C. confab. Page 84.

● Sewage Plant for N. Y. C.

Part of \$95,000,000 program to clean up municipal waters. Wellpoints dewater to last. Turn to page 88.

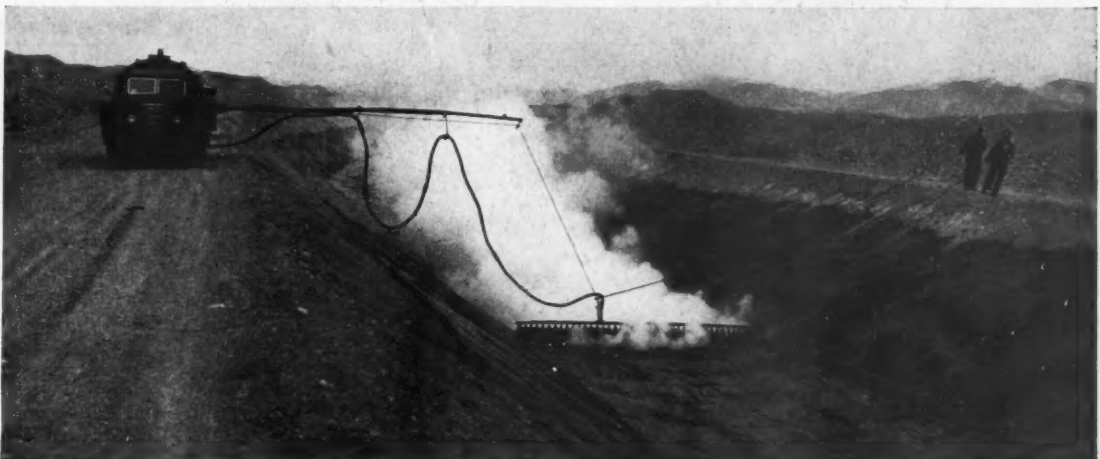
● Annual Road Costs

Page 94 tells how to determine depreciation charges by straight-line method. You will find "In This Issue" on page 4)



C. & E. M. Photo

OFFICE BUILDING. Ground water, quicksand, and clay troubled foundation work for a new State Office Building in Jefferson City, Mo. McKinney Drilling Co., Nacogdoches, Texas, wrestled with this contract. Page 5.



C. & E. M. Photo

CANAL LINING. Asphalt at 410 to 440 degrees sprays from an Etnyre distributor onto a Riverton Project canal to make it watertight. Page 28 covers the recent work by Studer Construction Co. of Billings, Mont.



C. & E. M. Photo

ROAD WIDENING. A Buckeye trencher modified by McCourt Construction Co., Akron, starred on an Ohio road-widening job (page 33). An Army half-track pulls it; a conveyor for moving dirt in cuts is suspended behind it.

NEWS AND VIEWS

of the construction industry — the controlled materials plan, whom it affects, how it works

The rustle of paperwork across the nation is fairly deafening this month as the **Controlled Materials Plan gets on its mark, set, and ready to go by July 1.** Up to now, a fairly simple priority system of DO-ratings has served to channel materials into defense production. But shortages and pressures have mounted, of course, and some plan of materials control has long seemed inevitable. It was finally announced April 12 by Manly Fleischmann, head of the National Production Authority.

CMP covers three basic metals—steel, copper, and aluminum—which go into nearly all "hard goods". Its first phase began in late April and early May when producers of certain listed commodities starting reporting, on Government forms, exactly how much of the basic metals they would need. Its second phase will begin July 1 when NPA starts allotting directly to producers specific amounts of these metals.

You will notice the phrase "producers of listed commodities". In general, **those who manufacture products for the Military, for AEC, or for construction supporting defense must file their needs under CMP . . .** So must those who use the basic metals to make anything except consumer durable goods (this is so NPA can gage their needs, too, and the impact the defense program is likely to have on their production, whether or not it is under CMP) . . . Those who make consumer durable goods need not file . . . Nor do repair shops

. . . But makers of repair parts must file.

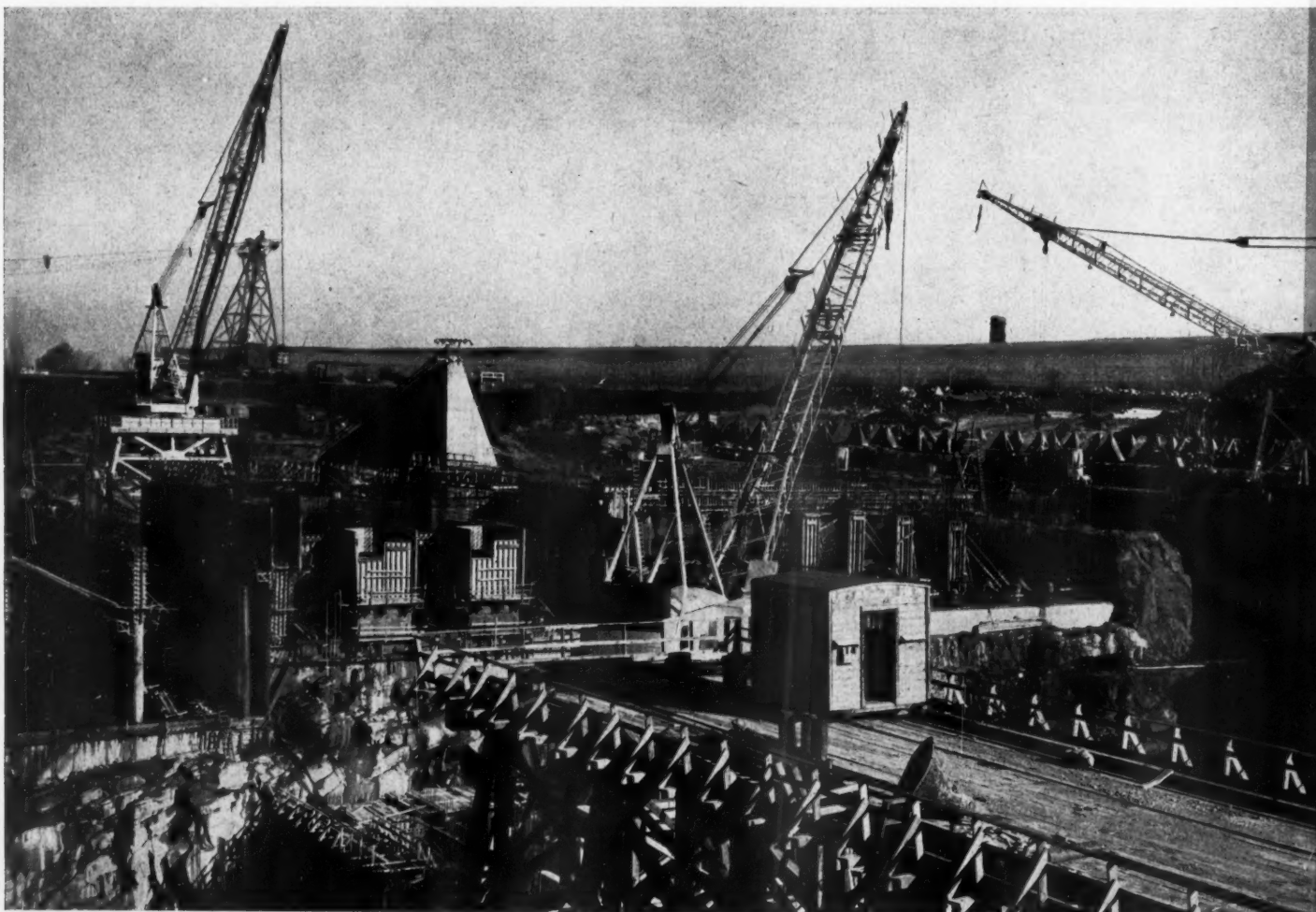
Here are some of the products on the tentative list: antifriction bearings, compressors, concrete products (reinforced), construction equipment in general, conveyors, electrical welding apparatus, fabricated structural-steel products, fasteners (bolts, nuts, rivets, etc.), hand saws and blades, hydraulic jacks and lubricating devices, internal-combustion engines and their electrical accessories, mechanical rubber goods, metalworking machinery including welding and cutting apparatus, motors and generators, motor vehicles (except passenger type), pumps, radio (except home type), repair and replacement parts, scales, sheet-metal products such as roofing and culverts, surveying instruments, tractors, valves and fittings, wheelbarrows and hand carts, wood-working machinery.

As in World War II, products programed under CMP fall into A and B categories. For some kinds of production it is easier to give authorizations vertically—those are A products, and their producers get authorizations and material allotments from their customers. (A prime contractor's customer is a Government agency; a subcontractor's customer is a prime contractor or another subcontractor.) For other products it is easier to give authorizations horizontally, straight to the producer—those are B products. Producers on the B list will get their authorizations and allotments from their NPA Industry Division . . . **After the**

first quarter of its operation, CMP will be decentralized and most producers will then apply to their local offices.

Mr. Fleischmann explains that **CMP offers not a hunting license but a cashier's check on a known supply of basic materials . . .** It will enable the NPA to match up vital defense needs with supply, and determine the balance left over for nondefense production . . . It will get what is needed where it is needed, on time and in the right quantities.

"Those who fear that the imposition of controls will rob us of our liberties", Commerce Secretary Sawyer said apropos of CMP when he addressed the Economic Club of New York in April, "are poor appraisers of the quality of liberty, or lack of it, which will be forced upon us if we fail in this undertaking of self-discipline . . . Those who oppose us mean business. If we don't mean business, we should throw in the sponge. We have incredible capacity and inventive genius, but they will not avail us unless they are used—and the time is here to use them. I believe we have also a great capacity for self-sacrifice . . . the need to exercise it . . . is here . . . **The decisions we make and the actions we take in the economic field may be as important as the decisions we make and the actions we take on the battlefield . . .** It is fantastic folly to believe that the burden of this effort will not eventually be carried by every one of us."



Wells Walls District, Corps of Engineers, Photo

Here is part of the work under way at McNary Dam near Umatilla, Oreg.—the first two units of what will ultimately be a 14-unit powerhouse. The 12 others will extend beyond the dam to join the spillway in the Columbia River. McNary will generate 880,000 kw of electricity, enough to light a city the size of Chicago.

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Plain Talk Will Win Public Road Support

Plain Talk Means Expressing Road Needs Not in Millions, but in Figures Mr. Motorist Can Comprehend

If Mr. Motorist listens to the petroleum industries, the American Automobile Association, and the National Highway Users Conference, he becomes convinced that he is paying too high a motor-fuel tax. If he listens to state highway departments and the Bureau of Public Roads (though their arguments, advanced with less fanfare, are much less likely to get his attention) he learns that our road system is deteriorating faster than we can accumulate money to keep it up to standard. Which set of figures shall he believe? How can we show him his personal stake in good roads?

The thing *not* to do is talk of road building as a \$4 billion national yearly business, to refer glibly to a \$500 million Federal-Aid Highway Act. Figures that big only overwhelm the ordinary owner of a motor vehicle. The thing to do is show him what roads cost him individually, and how much time and money he personally saves by having good roads at his disposal. That was the suggestion of James R. Law, Chairman of the State Highway Commission of Wisconsin, as he did a little thinking aloud on the subject at the 48th Annual Meeting of the American Road Builders' Association this year.

What We Get for Our Fees

Mr. Motorist hears that his road taxes in 1949 were up 54 per cent over 1941. But suppose he is led to do a little personal cost-accounting. Suppose he figures out, as Mr. Law did, that his Federal and state gas tax, plus his license fee, totaled a personal contribution for highways of only about 0.6 of a cent per mile of travel.

He may object that there were no such contributions in 1914 or 1915. But suppose you show him that if he had to travel 60 miles to do some business in 1915, it was necessary to start early in the morning, and he didn't get home until late at night. Now, by reason of those contributions, he can leave after noon lunch and be home before dinner. He saves four hours of time at, let us say, \$2 an hour, plus two meals at about \$1 each—or a total of \$10. To save that \$10, he contributed 75 cents in gas taxes and license fees. Once he's shown, he may wish he could make similar contributions toward his food, rent, and clothing, and obtain a similar return!

Fees Versus Other Auto Costs

Does Mr. Motorist have any idea how his road-user fees compare with his other "normal" automobile expenses? Have we told him in Mr. Law's kind of plain talk?

Depreciation on his auto, assuming a \$2,000 vehicle with a life of 10 years, amounts to \$200. Maintenance on his auto can be put roughly at \$100. His auto insurance will be about \$80, and so will his automobile financing, assuming the carrying charge only. Garaging for 12 months at \$5 a month will add up to \$60. So much for normal expenses. Now let's take a look—and get Mr. Motorist to take a look—at his road-user fees.

In Wisconsin, said Mr. Law, yearly registration fees, state and Federal gasoline taxes, and Federal taxes on oil, tires, and accessories will add up to a road-use charge for an average passenger car driven 10,000 miles of \$60 a year. In other words, Mr. Motor-

ist's road-use fees equal the cheapest item on his list of normal auto expenses—garaging! His payment toward highway construction, maintenance, snow removal, and administration

equals what he pays to keep his automobile motionless. If he knows that—if he's told and *shown*—he may well ask, "Which \$60 drives the better bargain?"

Why Do Roads Cost So?


Suppose he takes a long look at a stretch of neglected trunk line in his state and asks, "Why haven't my fees and other people's built up enough to get around to that road?" Does he have any idea how long it takes for a construction job to pay back the money it

costs? Have we shown him?

Take State Trunk Highway 30 between Madison and Milwaukee in Wisconsin, said Mr. Law. The portions of it built before 1947 averaged about \$100,000 a mile; a 15-mile piece of that construction represents \$1.5 million. A fair average of daily traffic on the road is 2,000 vehicles, 350 of them trucks. Annual registration fees, ton-mile tax, and motor-fuel tax give an annual earned income on those 15 miles of \$100,000.

(Concluded on page 101)

When a highway needs heavy-duty Asphalt paving...



New Jersey specifies FABC

This section of White Horse Pike in New Jersey was widened and resurfaced with a two-course Fine-Aggregate Bituminous Concrete pavement by Eastern Engineering Company of Atlantic City.

White Horse Pike is one of New Jersey's busiest east-west highways, linking Camden with Atlantic City, world-famous ocean resort. When a large mileage of the Pike called for resurfacing, the State specified Fine-Aggregate Bituminous Concrete paving, commonly known as FABC. Year after year, this dense, rugged, joint-free type of hot-mix paving has been constructed on important streets and highways throughout the State. Its ability to absorb punishing impact with a minimum of maintenance has become well-established.

A factor which many of New Jersey's FABC projects have had in common

through the years has been the use of Texaco Asphalt as binder in the mix. Produced from selected crudes under skilled supervision by the most modern refining methods, this asphalt has served road builders of New Jersey for more than 40 years. A Texaco-paved street in Newark continues to give satisfactory service after 43 years.

Helpful information on Asphaltic Concrete, as well as the various other types of asphalt construction for roads, streets and airports, is presented in two illustrated booklets, copies of which may be obtained free by writing our nearest office.

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 Boston 16 (20 Providence St.) • Chicago 4 (332 So. Michigan Ave.) • Houston 1 (720 San Jacinto St.)
 Jacksonville 2 (Hildebrandt Bldg.) • Denver 1 (910 - 16th St.) • Philadelphia 2 (1411 Walnut St.)
 Richmond 19, Va. (Mutual Assurance Society Bldg.)



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Slow Growth of Through Highways

During the last quarter of the nineteenth century and the first quarter of the twentieth, railroads had their greatest growth in this country. Although the first transcontinental railroad was completed in 1869, there was little other railroad construction west of the Missouri River, and by 1878 there were less than 82,000 miles of railroads in operation in the United States. But then railroad building spurted, particularly in the far west, and in the few short years to 1893 this railroad mileage doubled. The early lines were mostly short in length, compelling long-distance traffic to travel over several independent railroads. This condition was corrected very early in American railroad history, and construction after 1878 was planned for trunk lines and long-distance traffic.

Road building in the U. S. did not follow the transportation pattern of the railroads. Intersectional traffic got off to an early start when the National Turnpike or Cumberland Road, with the aid of the Federal government, was completed from Cumberland, Maryland, to Wheeling, West Virginia, in 1818. Interesting, as compared to present-day prices, was the \$13,000-a-mile cost for this 130-mile section. By 1844 the National Turnpike had been extended to Vandalia, Illinois, but then opposition arose from other sections of the country not benefiting from the highway. Federal assistance came to an end, road building was left to local governments, while the railroads proceeded in time to handle satisfactorily long-distance freight and passenger traffic.

The automobile, of course, radically changed the dominant position of the railroad in the transportation picture. At present, highways total over 3,000,000 miles in this country as compared to 227,244 miles of railroads. But the emphasis on through routes and real trunk-line highways has been late in coming to the fore. Only as the mid-mark of the twentieth century is reached, do we see any measurable progress in the development of true interstate expressways for motor vehicles. Most of this progress in the east, strangely enough, can be credited to neither Federal nor local governments. The through routes with their limited access, grade-crossing separations, divided pavements, and other safety features are mostly toll roads, built usually by authorities or quasi-governmental agencies under their own financing systems by which the road users pay all the costs.

Greatest of these toll arteries is the Pennsylvania Turnpike; the recent opening of its eastern extension increases its length to 260 miles between Philadelphia and Pittsburgh. Next year

a 67-mile section will extend the Turnpike to the Ohio border. Another link at the east will connect it to the New Jersey Turnpike, a 118-mile toll road scheduled for completion in 1951, running from a point near the George Washington Bridge at the Hudson River to the Delaware River Bridge crossing from Deepwater, New Jersey, to the west bank just below Wilmington, Delaware. The link from the New Jersey Turnpike to the Pennsylvania Turnpike will by-pass congested Philadelphia.

Excellent pay-as-you-ride through routes cross Maine, New Hampshire, and Connecticut. New York State is constructing a Thruway connecting its principal cities, which will be paid for by some form of license-plate toll arrangement. In the mid-Atlantic coastal states great new toll bridges are replacing ferries at strategic locations, clearing the way for speedy travel through points that had been traffic bottlenecks. The above-mentioned Delaware Memorial Bridge, to be completed in 1951, will handle traffic now carried by several ferries. During heavy holiday traffic via these ferries, six-hour delays in crossing the Dela-

ware have been experienced.

Farther south a 4-mile bridge is being constructed across Chesapeake Bay below Baltimore, eliminating a long ferry ride, and opening up the rich agricultural Eastern Shore or Delmarva Peninsula to big city markets across the bay. Continuing down the coast, another great structure is building athwart the York River at Yorktown, Virginia, also replacing a slow-going ferry. When these spans are completed, north-south traffic along the eastern seaboard can by-pass the congested cities of Philadelphia, Wilmington, Baltimore, Washington, and Richmond without having to use the leisurely ferry boats.

Unlike the railroads, which have about reached the saturation point in new construction, the highways of this country have a long way to go even to keep abreast of modern traffic demands. So far the accent on through or trunk routes is tied up with the toll facility—bridge, road, or tunnel. But we cannot mourn the passing of a free, really modern, safe, high-speed, through highway. We never had one in the first place.

Roy W. Crum Is Dead

Roy W. Crum, who had headed the Highway Research Board of the National Research Council for 23 years, died May 13 in Washington, D. C., after a brief illness. He was 66 years old.

He was born in Galesburg, Ill., and graduated from Iowa State College as a civil engineer in 1914. In 1928 he became Director of the Highway Research Board. He received the Iowa State College Merit Award in 1947, and in 1948 won the Marston Medal for Achievement in Engineering.

He was a member of the American Society of Civil Engineers, the American Concrete Institute, the American Society for Testing Materials, and other engineering groups. He had served on President Truman's Highway Safety Conference and was a well known specialist in highway engineering.

Construction Order Amended

The National Production Authority amended Order M-4 early last month. Large apartment houses, luxury residences, and all industrial facilities and public and private construction projects

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which require more than 25 tons of steel now have to have NPA authorization. This amendment will affect many new types of construction, including highways, bridges, schools, churches, hospitals, water and sewer systems and pipelines.

Construction that has commenced needs no authorization, of course, and the definition of "commenced" has been broadened in the amendment. Originally, "commencement" meant that a substantial quantity of material integral to or a permanent part of a project had already been incorporated in it. Now a project is considered to have commenced when the site has been substantially cleared—and clearing includes demolition of structures.

Another liberalization of construction regulations in the amended order provides for this further exemption: "Installation of personal property, fixtures, or equipment where the total cost incurred for installation in any consecutive 12-month period does not exceed \$2,000."

The growing steel shortage made the amendment necessary, the NPA says. The AGC has criticized the amended order on the ground that the NPA does not yet have enough administrative machinery to process applications for construction promptly.

NHUC Letter to Wilson Outlines a Highway Program

The Board of Directors of the National Highway Users Conference has written to Charles E. Wilson, Director, Office of Defense Mobilization, suggesting ways to integrate highways and the defense program.

It recommends that the Committee on Defense Transportation and Storage establish a clear-cut policy recognizing the importance of highway transportation in the emergency and including an accelerated highway improvement program. Steps should be taken to eliminate critical road deficiencies, with emphasis on the national system of interstate highways and access roads. The Board also urges that a separate Automotive and Highway Division be established in the National Production Authority, and that its head report directly to the Administrator. He should be an experienced highway engineer, says the Board, able to advise on highway matters and to serve as a liaison with the U. S. Commissioner of Public Roads. He could be of great service in the allocation of materials. The Board also recommends that the Defense Production Administration appoint some one experienced in highway transportation as a high-level adviser to analyze highway problems and develop policies and programs insuring adequate and efficient transportation.

TAKE CARE OF WHAT YOU HAVE!



Foundation Problems Rough on Contractor

Quicksand Pockets, Ground Water, and Clay Over Limestone
Foundation Slow Missouri Building Contractor

By RAYMOND P. DAY,
Western Editor

(Photo on page 1)

ONE of the worst Missouri winters in years, coupled with foundation conditions that were naturally bad, has complicated construction of Missouri's new \$4,100,000 State Office Building in Jefferson City. Quicksand, soft clay, and water-bearing gravels in the building foundation have slowed the top-priority structure near the State Capitol Building which MacDonald Construction Co. of St. Louis is constructing for the Missouri Board of Public Buildings.

Designed by Marcel Boulicault, St. Louis and Jefferson City architect, the 13-story building calls for 111 reinforced-concrete piers, ranging from 3-foot diameter to 6 x 12 feet in size. The piers extend to solid rock. In several cases, owing to the uneven pitch of solid limestone, these piers had to penetrate through 48 feet of waterlogged overburden to reach a firm foundation.

One of the nation's well known foundation contractors, McKinney Drilling Co. of Nacogdoches, Texas, received the foundation subcontract for structural excavation and construction of the piers. The extensive experience in heavy foundations which McKinney has built up over the years has whipped most of the obstacles, and foundation work is well along. By December 15, 1951, MacDonald Construction Co. hopes to have the building ready for occupancy.

Aluminum and Concrete

The State Office Building will be an aluminum-exterior structure, with a rigid reinforced-concrete framework, and piers of the same material. The basement and first floor will cover an area 205 feet square. Above the first floor the building will measure 71 x 193 feet, and the foundation piers under the low part of the building will permit future height-limit extensions to full dimension if that ever becomes necessary.

Aluminum window sash, aluminum exterior, full air conditioning, steam heat, and flat-slab floors finished in terrazzo, asphalt, or ceramic tile will feature the new office building. At the present time it has not been definitely established which administrative functions of the State of Missouri will be housed in the new building. It will be a definite landmark on the Jefferson City skyline, ranking in height close to Missouri's capitol.

A Bad Foundation

The first order of construction was the excavation of the main block of clay and sand to the basement floor level. A small subcontract was let to S & S Excavating Co. of Columbia, Mo., for the removal of that material. The subcontractor had little trouble with that portion, because it was readily accessible to two Northwest power shovels, a small Unit dragline, and a fleet of dump trucks. An access ramp was left in at the western side of the building, and the trucks used that means of getting out of the hole. Ground water began to show up when the basement floor grade was reached, and McKinney's men, who had arrived on the site, knew this would be one of their tough jobs.

A powerful rotary drilling rig, one

of McKinney's newest, was used wherever possible. Mounted on a 5-ton Diamond T truck chassis, the rig consists of a 50-foot mast, a Continental 85-hp drill engine, a 4-inch solid-steel Kelly bar, various drill bits, and hydraulic outriggers and jacks. Precision spotting of a hole is assured because this rig has about 2 feet of leeway built in, so the mast can be moved about 2 feet in either direction by hydraulic jacks to insure exactness of location. The rig will drill a hole up to 8 feet in

(Continued on next page)



C. & E. M. Photo

Looking west across the foundation for the Missouri State Office Building, we see an air tugger at work, part of the Unit rig, and a Northwest in the background.

CHECK CPY* It pays!

* **Cost Per Yard** is the best figure to keep in mind when you check your tire bills. And when you do, you'll find—as other cost-conscious construction men have already—that cost per yard is satisfactorily low when you use Goodyear's special-purpose, special-tread, job-specialist tires.

On a cost-per-yard comparison you're sure to find that **It pays to Buy and Specify Goodyear!**



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MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

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Foundation Problems Rough on Contractor

(Continued from preceding page)

diameter 43 feet deep.

So long as drilled foundations could be used, McKinney's crews made fair progress. Shallow quicksand pockets and waterlogged gravel gave a little trouble, but small Ingersoll-Rand air pumps driven by a 500-cfm Gardner-Denver compressor dried up the holes, and there was only minor caving. One hole was so bad the steel casing had to be left in, but it was an exception.

But some of the foundation holes were rectangular or square, and these had to be dug by whatever methods would work. By the time this work got under way, winter had set in. Freezing weather, heavy snow, and other precipitation was the rule. The foundation became wetter and wetter, and water pumping became an ever-increasing necessity.

The sides of the main excavation cut began to slide in, and wooden piles had to be driven every 10 or 12 feet to hold a timber bulkhead wall. The piles even had to be shored up by 12 x 12 timbers as an added precaution.

The slow excavation of rectangular piers was toughest of all the foundation problems. It was a dangerous operation at best, because quicksand pockets were encountered and every hole had to be internally braced. Quicksand pockets or layers were whipped by laminating three 1 x 10-inch boards together to make a 3-inch tongue-and-groove sheeting, and then driving these sections through the formation. Pneumatic sheet-driving guns were used for this, and there were six Ingersoll-Rand pneumatic guns for jackhammer work, operation of clay spades, moil points, and so on.

At first, six small pneumatic air tuggers were used to hoist earth out of the holes, but it was too slow a process. McKinney's men then got some heavy oil drums, had them fitted with a heavy steel strap bail and dump hoop, and worked several holes at once with a Northwest crane centrally located to serve several holes. The small Unit machine which S & S had used was also rented, fitted with a small orange peel clam, and used for excavation in firm material.

"It was like digging it out with a spoon until we doubled up that way", said D. L. Windham of the McKinney organization, "and we thought we'd never get out of the way. But now we're going better." When CONTRACTORS AND ENGINEERS MONTHLY visited the building, most of the foundation work had been completed, with the exception of a few stubborn rectangular holes, and some of the basement forming had begun.

Concrete work will be conventional, and MacDonald's men expect to move fast when the footing problem is solved. All exterior concrete will be formed by



C. & E. M. Photo

Half-frozen with cold are General Superintendent Louis Boos of MacDonald (left), Assistant Superintendent Tate (center), and Resident Engineer D. A. Brown representing the architect on the office-building contract.

plywood facing. The columns will be enclosed in steel forms, and Superior and Universal patented form ties and clamps will hold the forms together. A rich concrete mix, with Pozzolith added to make the walls as dense as possible, will be used. Wooden forms will be made up in a yard near the job.

Surveying is the last item of interest, and certainly not the least important. The building lines are the property lines, and it was necessary to use temperature calculation, spring-balance chaining, and other such refined methods of locating the building corners.

Personnel

Field personnel for MacDonald Construction Co. include Louis Boos, General Superintendent; Tom Knobel and C. E. Tate as Assistant Superintendents; and Jack Adams and Dick Patient as Project Engineers. D. A. Brown, representing the architect, is Resident Engineer.

Structural-engineering design is by

(Concluded on next page)

LAND CLEARED for Highways . . . Powerlines

by

FLECO

ROOT RAKE

ROCK RAKE

DETACHABLE STUMPER



SAVE

**MONEY
MANPOWER
TIME
TOPSOIL**

A DIESEL D8, equipped with a FLECO ROCK RAKE, owned and operated by the Roy M. Jenson Construction Co., Salt Lake City, Utah, building a highway in the Mirror Lake section. The ROCK RAKE was ideal for removing rocks and leaving the dirt fill.

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M-K TARZOFF

a safe, slow evaporating tar remover that is harmless to paint. Just spread it on—wait a few minutes—then wipe it off.

Write for free sample and prices. Available in all sizes, half pints to barrels.

MOTOR KOOL PRODUCTS CO., Inc.
505 Buttes Ave., Columbus 8, Ohio
Phone: MAin 4712

William C. E. Becker of St. Louis, and mechanical engineering was designed by Ralf Toensfeldt of St. Louis. Gamp Electric Co. of St. Louis has the electrical subcontract, and Jacobson Plumbing & Heating Co. of Kansas City has the installation of those utilities under a subcontract.

Visual Warning Unit Guards Power Source

A unique system designed to signal whenever there is engine trouble in your truck, tractor, or machinery power source has been developed by Rochester Mfg. Co., 9 Rockwood St., Rochester 10, N. Y. The Tellite flashes a light to warn operators of any engine malfunction which might result in damage to engine parts. It will show low oil pressure, low air-brake pressure, excessive heat rise, generator failure, or partial set of the hand brake. It may also be used to indicate abnormally high or low temperatures, pressures, or electric current.

The Tellite system gives three indications—lights off, dim light, and flashing light. A dim light glows when all connections are operating normally. It remains dim when the engine idles. A condition which would make further engine operation unsafe or harmful causes the Tellite to flash a warning. The company points out that the switches, flasher, and lights are vibration-proof. Normal vibration or surges in temperature or pressure will not cause the system to respond, the company says, since a normal time lag has been built into the unit to avoid just such a condition. Where abnormal pulsations or vibrations cannot be handled by this time lag, pulsation dampeners may be added.

Any number of pressure and temperature-control switches may be used in the warning circuit without affecting its operation, the company says. One Tellite warning light may be used for checking a large number of points throughout an engine. The operator may then determine the cause of the flashing Tellite by checking the engine instruments. If preferred, however, one Tellite can be used for each engine part.

The company points out that in addition to the warning system feature, the condition switches may be used as control units to reduce speed, or stop the engine before a dangerous situation develops.

Further information may be secured from the company by requesting Catalog No. TE151. Or use the Request Card at page 16. Circle No. 195.

Data on 3-Hp Engine

A circular which describes, illustrates, and gives complete specifications for the Series C-1100 gasoline engine is available from the Clinton Machine Co., Maquokita, Iowa. This air-cooled engine is rated at 2 to 3 hp.

The Series C-1100 has a displacement of 8.3 cubic inches and a compression ratio of 6.2 to 1. The high-voltage moisture-proof and dustproof magneto is permanently charged. The company recommends the engine for powering such items as generators, pumps, chain saws, conveyors, mixers, tampers, drill rigs, brush cutters, sand spreaders, sprayers, and winches.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 213.

Burnside at American Lumber

Bradley A. Burnside has joined the American Lumber & Treating Co., Chicago, as Assistant to R. B. Putman, General Sales Manager. He will direct technical sales research and the development of new uses for pressure-treated lumber and plywood.



Reverse mounting features the new Reese loader for a Minneapolis-Moline tractor.

New Tractor Loader Is Reverse-Mounted

A new loader has been developed by Reese Engineering Co., 4441 Santa Fe Ave., Los Angeles 58, Calif., for reverse mounting on the Minneapolis-Moline UTIL wheel tractor. The company reports that the principle of re-

verse mounting gives the unit greater stability, load capacity, steering ease, and bucket control. The Model C-125R is rated at 8,000-pound lifting capacity and has a bucket capacity of 1 1/4 cubic yards struck.

Fork lift, angle-blade dozer, angle-blade snow dozer, bulldozer, and jig boom are also available from the com-

pany as interchangeable attachments for the UTIL tractor. The company reports that the operator can hold the bucket or fork lift at a constant level during the lift from ground to dumping position; this does not require manual operation of the controls.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 176.

Safety Award to C & E Monthly

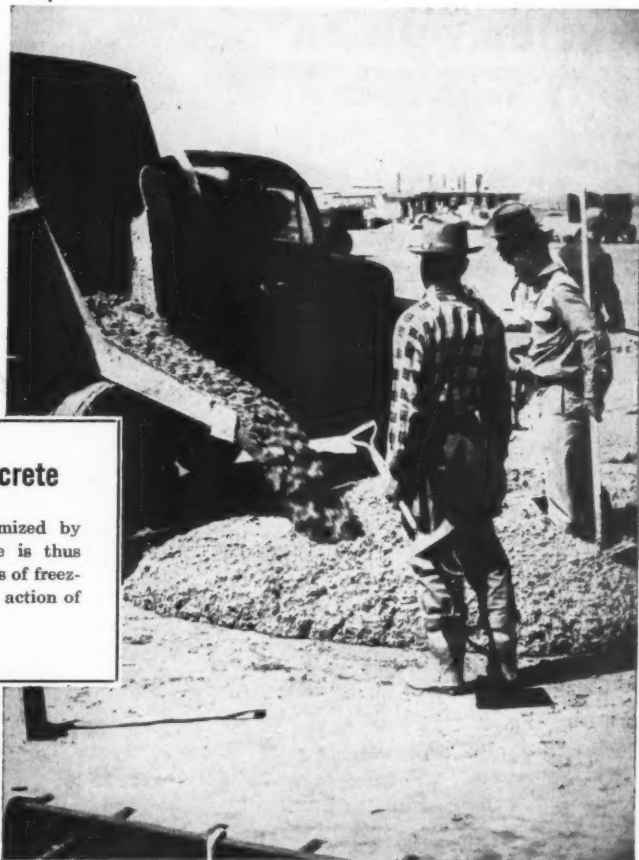
CONTRACTORS AND ENGINEERS MONTHLY has received a 1950 Public Interest Award from the National Safety Council for exceptional service to safety. Other public-information media receiving awards for their work last year were 19 daily and 5 weekly newspapers, 63 radio and 7 television stations, 3 radio networks, 6 general-circulation and 23 specialized magazines, 20 advertisers, 3 outdoor-advertising companies, and one film producer.

This is the third year one of these awards has gone to C&E MONTHLY.



Better for paving work

Concrete made with Duraplastic air-entraining portland cement needs less mixing water for a given slump. The resulting concrete is more workable, more plastic and more uniform. It dumps, spreads, and finishes easily, allows earlier protection for curing. (Photo right shows Duraplastic concrete being poured for a section of landing strip at Hutchinson, Kansas, Municipal Airport. Note cohesiveness and uniformity of mix. Contractor: J. H. Shears' Sons, Hutchinson, Kansas.)



Makes more durable concrete

Segregation and bleeding are minimized by using Duraplastic cement. Concrete is thus fortified against the destructive effects of freezing-thawing weather and the scaling action of de-icing salts.

YET DURAPLASTIC* COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

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DURAPLASTIC

AIR-ENTRAINING PORTLAND CEMENT

Makes Better Concrete at No Extra Cost

"THE THEATRE GUILD ON THE AIR"—Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network



CE-D-128



For close quarters and wherever many small holes must be drilled—Cleco's new air-operated 9 DBW-28A drill.

An Air-Powered Drill

A new air-operated small drill has been placed on the market by the Cleco Division of the Reed Roller Bit Co., 5125 Clinton Drive, Houston, Texas. It features a stub-tooth gear train, a built-in lubricator, a sealed spindle

bearing, and a chuck guard.

The small size—5¼ inches over-all length and 13/16 inch from the side to the center of the spindle—contributes to easy operation in close quarters. The manufacturer states that the Cleco 9DBW-28A is useful in applications where a large number of small holes must be drilled.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 121.

Sterling Plant Transferred

The plant equipment of Sterling Mfg. Co., Kansas City, Mo., a recently acquired subsidiary of the Essick Mfg. Co., Los Angeles, Calif. (C. & E. M., April, 1951, pg. 89), has been transferred to Los Angeles. The relocation began April 2 and was completed in two weeks. To accommodate the Sterling equipment, part of the Essick manufacturing facilities will be transferred to a building now under construction adjacent to the Essick plant.



The Stewart & Stevenson cable-dump bulk cement trailer tilts to a 60-degree angle to give fast unloading. It is available in capacities up to 30,000 pounds.

Bulk-Cement Trailer Features Cable Dump

A new cable-dump bulk-cement trailer has been announced by Stewart & Stevenson Services, Inc., 4516 Harrisburg Blvd., Houston 11, Texas. It is available in any capacity up to 30,000 pounds.

The trailer tilts to a 60-degree angle and, with the one-inch air vibrator, permits fast unloading of all cement without additional attention, the company says; dumping is said to be efficient even with the cab at a 90-degree angle to the trailer. The manufacturer points out that cable dump-type trailers eliminate heavy subframing and complex mechanisms, thereby reducing maintenance cost. There are three parts to the lifting unit: the 12,000-pound winch, the cable, and the lift arms.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 107.

Saw Blade Cuts Nails

A new nail-cutting saw blade for portable saw machines has been developed by The Carbide Saw & Tool Co., 327 S. LaSalle St., Chicago 4, Ill. It cuts by milling action through corrugated asbestos-cement board and other abrasive building materials, dirty form lumber, wire-reinforced wall boards, and flooring containing common nails. The company reports cutting over 50 common tenpenny nails in 2 x 8 hard maple, followed by repeated passes through hard maple, and then cutting 20 feet of corrugated Transite across the corrugations without damage to the saw blade or loss in cutting efficiency.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 104.

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VIBER Vibrators
Exclusively on
this Big Job"

20 YEARS
EXPERIENCE MAKING
ONLY CONCRETE VIBRATORS

Viber Company has spent over twenty years in research, development and field tests on concrete vibrators. This concentration has produced dependable vibration equipment

ACCEPTED by ENGINEERS and CONTRACTORS the WORLD OVER

Literature will be furnished immediately upon request.

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	LOAD	MAX. HEIGHT	CONCRETE BUCKET CAPACITY
HEAVY	5000#	UNLIMITED	1 cu. yd.
LIGHT	3000#	201 ft.	½ cu. yd.



Write for parts catalog and construction techniques.
NEW—Lightweight low-cost, panel-type PT Towers. Send for descriptive brochure.

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New
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Boom only can be supplied for use with old-style mast and bottom

Single line cap. 300' @ 100 feet per minute

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The most complete line of contractors' derricks, hoists, and winches. Write for catalog.

The Sasgen line is handled by leading equipment distributors everywhere.

SASGEN DERRICK COMPANY
3131 W. Grand Avenue, Chicago 22, Ill.

Dozer-Mounted Saw Cuts Clearing Cost

Contractors Use Ingenuity in the Development of Special Tractor-Mounted Tool; Cut 15-Inch Trees in One Pass

THERE are 12,458 acres in Wyoming's Boysen Dam Reservoir, and the cottonwoods and willows are as thick as the hair on a coyote's back. Because of the size of the trees, the clearing schedules for the U. S. Bureau of Reclamation were a source of some sharp pencil figuring... until a Minnesota contractor came in with a novel idea.

This contractor, Mid-States Construction Co. of Chisholm, Minn., built special outrigger extensions with saw teeth to fit on the front end of a bulldozer moldboard. Other contractors picked up the idea, and now powerful tractors are ripping in one pass through trees 15 inches in diameter at the butt. It isn't unusual for one machine to clear from 8 to 15 acres in an 8-hour shift.

The device has even been altered slightly and, with the addition of smaller teeth, made to cut small willows as fast as a tractor can move along.

While the various contractors use slight variations, the basic model of the dozer saw consists of a heavy rigid steel frame, built in a V-shape, with a heavy shoe which bolts to the moldboard of the dozer. The upper part of the frame either bolts direct to the dozer frame, or fastens to a special welded connection on the dozer.

At the base of the saw frame there are blades on both sides, usually made of 40 to 50 per cent carbon steel, with large saw-like teeth welded on. One contractor made his saw blades out of the cutting edges of motor-grader blades and welded the whole strip to the bottom of the saw frame. As a general rule the saw blades are at least 1/2-inch thick for tractors like the Caterpillar D7. Mid-States Construction Co. is building one with 3/4-inch plate for an International TD-24, and when it is finished, the company expects nothing to stop this powerful machine.

The willow cutters which have been developed have a wider V-angle, and are built on frames similar to a V-type snowplow. The bottom cutting edge has much finer teeth than the tree clearers. Advantages of both types of machines include greater speed, lower per-acre clearing cost, and a tendency to cut the trees down flush with the ground. The stumps are therefore automatically eliminated, and other dozers can rake up the brush in piles without bothering about stumps.

How Clearing Works

Most of the seven contractors in Boysen Reservoir use similar clearing methods. The tractor operator selects a large area and goes to work first on its outside perimeter. The best tractor operators develop such skill that they can fall the trees wherever they want them to go. The machine lowers its dozer blade so the saw is flush with the ground, eases up to the tree, and as the tractor comes ahead in first gear, the operator crowds the saw into the tree with his port steering clutch. The saw

cuts through the base of the tree and, as it begins to topple, the operator guides its fall with his dozer blade. The idea is to make the tree fall out at right angles to the standing area, leaving the down timber laid out neatly so the stacking dozers can have an easier job.

In no other equipment operation does the skill and conscientiousness of the operator seem to play such a big part. Severe twisting forces are at work on the saw frame even under good conditions, so the operator has to be sufficiently skillful to make a straight, clean cut without placing the blade in a twist. The saw seems to work better when the operators use first gear rather than some faster speed. When they are used right, the saw blades last a month without losing teeth or causing trouble. And the speed of clearing is so amazing it has to be seen to be appreciated. The big cottonwoods fall in rapid-fire succession as the dozer moves along.

The clearing contractors all have



C. & E. M. Photo

This closeup of the dozer-mounted saw shows how the teeth are arranged for the bigger trees.

small spreads: a few dozers, an arc welder, a pickup truck or two, and small portable field shops. Equipment is serviced in the field. If the tractors (Concluded on next page)

For Economical Earthmoving

Cable or Hydraulic controlled **SOUTHWEST HAULING SCOOPS**

3, 5 and 8 cu. yd. Capacity

FOR SHORT OR LONG HAULS



SPREADS



LOADS



DUMPS



LOADS



CARRIES

MATCH THE JOB with Southwest Hauling Scoops. They're made in three sizes for cable or hydraulic control.

They're fast loading! Cutting edge is sucked into the ground and dirt fills freely the 2-way tapered bowl.

They're fast moving! High ground clearance prevents "hanging up" on the roughest ground. *They'll spread the load* and they will dump over an embankment. *They can discharge the load* while moving forward, backward or standing still.

For complete information, see your "Southwest" dealer or write today.

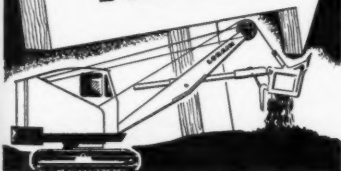
CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

Alhambra, California

HAULING SCOOPS BULLDOZERS LOADERS BOTTOM DUMP WAGONS RIPPERS TAMPERS SCRAPERS TREE DOZERS

**LORAINS
AHEAD!**



FOR MORE ON LORAINS TURN THE PAGE

Dozer-Mounted Saw Cuts Clearing Cost

(Continued from preceding page)

are working in soft sandy ground or other unfavorable spots, they come out to the service trucks once a shift.

Five Clearing Schedules

Five clearing schedules are involved at Boysen. Schedules 1 and 2 were done by the C. L. Hubner Co. of Denver, and Albert M. Conrad of Big Piney, Wyo. Hubner's work is finished, and Conrad is currently finishing his part of Schedule 2 with the help of Stiers Construction Co. of Lander, Wyo.

Schedule 3, by Mid-States Construction Co., is rapidly nearing completion. Schedule 4 is being done by two firms: Lindquist, Olson & Co. of Cambridge, Minn., and Watkins & Pennington of Fort Collins, Colo. Lichty Construction Co. and Brasel & Whitehead of River-ton, Wyo., have the contract for Schedule 5. Total clearing cost for the various contracts is \$627,136.

The work includes all trees and brush between the minimum low-water elevation and the maximum high-water pool of Boysen Reservoir. For the most part it includes cottonwoods and willows, although the sawing scheme will also work on birch, maple, and other harder woods, according to Robert Arro of the Mid-States organization.

Boysen Dam

Boysen Dam, now under construction by Morrison-Knudsen Co., Inc., is located on the Big Horn River about 15 miles south of Thermopolis, Wyo. The dam is being built to provide 1,493,000 acre-feet of storage capacity for power production, irrigation, silt control, and flood control. A power plant of 15,000-kw capacity is being built under the M-K contract to utilize the available power head.

The storage capacity provided will permit the development of irrigation units now authorized in the Big Horn Basin, and will aid in the solution of the Montana-Wyoming controversy over additional use of the waters of the Big Horn River. No irrigation development will be included directly as a part of the Boysen Unit, which is a part of the Missouri Basin Development program.

Settlement in the Boysen vicinity dates back to the mid-1800's, with the first known irrigation works being built in the 1860's along the Popo Agie River near Lander, Wyo., south of Boysen Dam.

Within approximately 15 years, settlement became more extensive and irrigation works were built by private organizations and individuals in the areas adjacent to the foothills where easy diversions were available. Irrigation continued as a private-enterprise endeavor until 1920, when opportunities for low-cost diversion were practically exhausted.

In 1908 a dam was built across the Big



C. & E. M. Photo

Wham! Two cottonwoods bite the Wyoming dust. It didn't take the dozer-mounted saw long.

Horn River about 1½ miles downstream from the present Boysen Dam.

Asmus Boysen, a Wyoming business man who built the first dam, hoped to develop a source of hydroelectric power. The actual power output averaged about 710 kw, a far cry from today's 15,000-kw plant.

In 1922 a flood occurred in the area, and the reservoir was increased to such a point that several miles of the C B & Q railroad were inundated. The flooding of the tracks resulted in court action, and the dam was dynamited to reduce the reservoir. Repair of the dam was never undertaken.

The Bureau of Reclamation made investigations of the area in 1904, and again in 1916-17. In 1939 the Corps of Engineers duplicated much of that work, and recommended construction of a dam at the old site. The USBR resumed its studies, in 1941, which resulted in the inclusion of the reservoir in the Missouri Basin program.

Present clearing and construction is under the general supervision of Chief Engineer L. N. McClellan of the USBR, with Kenneth F. Vernon as Regional



C. & E. M. Photo

Clean stumps, flush with the ground, are characteristic of the new clearing method in use at Boysen Reservoir. Mid-States Construction Co. of Chisholm, Minn., devised the method and others on the project adopted it.

Director at Billings, Mont. G. Raymond Roland is Project Engineer, and M. C. Wren is Chief Inspector.

IT'S BIG RUGGED FAST SMOOTH

LORAIN 50 SERIES

25-Ton MOTO-CRANE

Everything about the 25-ton Lorain-50 "Series" Moto-Crane is new! From the ground up the "50" is designed and built for 25-ton capacities. These new rubber-tire Moto-Cranes are not modifications, reworkings and "up-ratings" of previous models. However, in designing these new machines, Thew-Lorain has drawn heavily from its unequalled record of over thirty years of experience and "know-how" acquired since building the first rubber-tire "truck-crane" in 1918. The new Lorain-50 "Series" Moto-Cranes are just what you'd expect the leader to produce—a bigger, stronger, safer, better machine. Your Thew-Lorain Distributor can provide full facts!

THE THEW SHOVEL CO., LORAIN, OHIO

25-Ton Crane Boom

- Wider, deeper, stronger
- Quick action pin-connections
- Usable in 100-ft. lengths—130-ft. with extensions
- 6-part direct hoist line reeving with 3-sheave boom end
- Convertible to clam, drag, shovel, hoe, pile driver

Throttle Control

- Smoothest acceleration for raising or lowering loads
- No jerks, jolts or bounces
- A wider range of raising and lowering speeds
- Pin-point precision for spotting loads

25-Ton Turntable

- Hydraulic Coupling gives the smoothest operation—no jolts, bounces
- New, wider shoe type swing clutches
- Turntable rollers on anti-friction bearings
- Uniform-stress Center Pin design

25-Ton Carrier

- Built specially for 25-ton crane and 1-yard shovel stresses and impacts
- Box section frames deeper, stronger
- 220 H.P. gas engine
- 10 forward speeds (30 M.P.H.); 2 reverse speeds
- Man-saving, air-assist steering

2 Models

Lorain-50 "Series" Moto-Cranes are offered in these models:

MC-504—25-ton capacity, 102 in. overall width, "6x4" only

MC-504W—25-ton capacity, 120 in. overall width to give greater lifting capacities when working "on rubber," "6x6" and "6x4"

THEW LORAIN

Construction Buildings Bolted Together In a Few Hours!



The answer to needs of contractors, architects and engineers for a low cost, quickly erected and dismantled building. Proven ideal for field offices, workshops, tool sheds, storage and bunk houses. Built in unit-sections, reusable on job after job. 6-sided "base" buildings in 4 different sizes are extendable to any length. Finest West Coast Fir throughout. Write for Circular.

WRIGHT COMPANY

9317 Cottage Grove Ave., Chicago, Ill.
RAdcliff 3-0212



The Galion 3 to 5-ton tandem roller compacts a blacktop floor during the construction of a large building.

New Tandem Roller For 3 to 5-Ton Work

A new 3 to 5-ton variable-weight tandem roller with hydraulic steering, spur-gear final drive, and constant-mesh transmission has been announced by The Galion Iron Works & Mfg. Co., Galion, Ohio. A towing attachment is available as an extra to transport the roller from job to job like a trailer. The roller is raised from the ground and rides along on a set of auxiliary roller-bearing wheels equipped with stub axles and heavy-duty pneumatic tires.

The roller has Twin Disc over-center forward and reverse clutches; combination service and parking foot brake; compression roll 48 inches in diameter x 42 inches wide; and a 2-section steering roll 30 inches in diameter x 40 inches wide. Rolls are fitted with mats and a sprinkler system and they can be ballasted with water. The total metal weight of the roller is given as 7,650 pounds, and the total ballasted weight as 11,150 pounds. The Galion 3 to 5-ton tandem roller is equipped with a 4-cylinder 25-hp gasoline engine. Two speeds—controlled by a single lever—are provided for both forward and reverse travel.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 205.

New Warning Signal Blinks When Upright

A new emergency warning signal, which starts to work when placed in an upright position, has been announced by Safety Clothing & Equipment Co., 7016 Euclid Ave., Cleveland 3, Ohio. It sends a flashing warning signal that can be seen from all directions. The neon tube, available in red, white, amber, blue, and green, is rubber-mounted and shockproof. The lens and lid of the metal case are sealed against dust and moisture. The standard 6-volt lantern battery may be easily replaced.

The company reports that the Thoro-Flare will operate continuously for 100 hours with a new battery; that it will not operate in any position other than



The Thoro-Flare flashing signal operates as soon as it is standing upright; it requires no external switch.

upright. It requires no external switch, and it is said to flash underwater or at temperatures 20 degrees below zero.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 174.

Vapor Steam Cleaner

A vapor steam-cleaning unit has been announced by Aeroil Products Co., Inc., Wesley St., South Hackensack, N. J. It is designed to develop 100 pounds of steam pressure in 90 seconds. It features completely visible panel control, automatic operation, a balanced swivel gun with gun-control shutoff, and a heavy-duty 1/2-hp motor. The Aeroil Auto-Steam cleaner has



The Auto-Steam cleaner develops 100 pounds of steam pressure in 90 seconds.

an 11-gallon fuel tank and a 15-pound dry-compound tank. It is said to convert 120 gallons of water per hour. Operating pressures range from 75 to 125 psi. The new unit is available in portable and stationary models with or without the modern designed cabinet.

Further information may be secured from the company by requesting Bulletin No. 900. Or use the Request Card at page 16. Circle No. 172.

Bil-Jax Man in Western N. Y.

Fred R. Delivs, sales representative for Bil-Jax, Inc., Archbold, Ohio, is handling the firm's line of tubular steel scaffolding and equipment in western and upper New York State.

The great line of LAPLANT-CHOATE

Earthmovers



The popular MOTOR SCRAPERS

TS-300 MOTOR SCRAPER

WHEN your job calls for moving big volumes, you can bank on the high production features of the big TS-300 Motor Scraper. Big capacity . . . 14-cu. yds. struck and 17.5-cu. yds. heaped. Speeds in excess of 22 mph. Easy loading and positive forced ejection cut seconds off the operating cycle. Big power . . . with your choice of two Diesel engines—Buda 6-DAS 844 at 280 HP, or Cummins NHS-600 at 275 HP. Investigate all the profit-making features of the TS-300 today!

TW-300 MOTOR WAGON

HERE'S a hydraulically controlled bottom dump wagon flexibly joined to the same tractor used on the TS-300 Motor Scraper. 14- to 19-cu. yd. capacity, high speed and rugged power, plus many other money-saving features make this an outstanding unit.

TS-200 MOTOR SCRAPER

The TS-200 is a 9- to 12-yd. hydraulically controlled earthmover small enough for small yardage jobs, yet with all the capacity, power and speed necessary for high production on your long haul jobs.

LAPLANT-CHOATE CABLE and HYDRAULIC SCRAPERS

C-314 CABLE SCRAPER

FOR short hauls with track type tractors, you can't beat the performance of C-314 Cable Scrapers. 14-cu. yd. capacity struck, 17.5-cu. yd. heaped. Designed for use with tractors of more than 110 HP. Easily converted for use with T-300 Tractor to become high-speed TS-300 Motor Scraper.



4-YD. HYDRAULIC SCRAPER

FOR smaller jobs with either track type or industrial, rubber-tired tractors. Improved, single-unit hydraulic system provides direct and instantaneous control of bowl and ejector, plus down pressure on the cutting edge when needed. 4-yd. or 2-yd. sizes available.

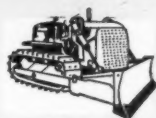


C-108 and C-106 CABLE SCRAPERS

The C-108 is an 8.4- to 11-cu. yd. scraper for use with tractors of 75 to 110 HP. The C-106 has capacities from 6.1- to 7.5-cu. yds. and is ideal for use with 55 to 75 HP tractors. Both scrapers have the same outstanding performance characteristics as the larger C-314.



There is a size and type of LaPlant-Choate Scraper for every earthmoving job—see your LPC distributor today.



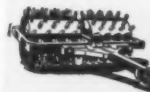
LaPlant-Choate DOZERS

Famous LPC Dozers, both angling and straight blade, are available in hydraulic types in D2, D4, D6, D7 and D8 sizes, or in cable-operated types in D7 and D8 sizes.



LaPlant-Choate RIPPERS

The Model RP-82 heavy-duty three-tooth ripper for use with large size tractors.



LaPlant-Choate TAMPERS

LPC Tampers are available in two popular sizes—the DSR 224 double drum and the TSR 336 full oscillating triple drum.

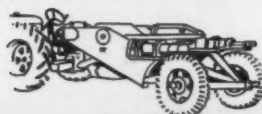
LAPLANT-CHOATE MANUFACTURING COMPANY, INC.
Cedar Rapids, Iowa

LAPLANT-CHOATE SALES AND SERVICE
1022 77th Ave., Oakland, Calif.

LAPLANT CHOATE



4-yd. Hydraulic Scrapers for rubber-tired industrial tractors. Easily converted for use with track type tractors.



2-yd. Hydraulic Scrapers used with



TW300 Motor Wagon—hydraulically controlled bottom dump wagon, used interchangeably with same prime



Esco track-walking shoes permit a crawler tractor to run on standard-gauge railroad track without injury to the rails in mounting or dismounting.

Track-Walking Shoes Move Crawler on RR

Specially designed track-walking shoes for tractors, with flanges corresponding to the flanges on a car wheel, have been developed by Electric Steel Foundry Co., 2141 N. W. 25th Ave., Portland 10, Ore. The new development enables a crawler tractor to run on standard-gauge railroad tracks and facilitates track laying, roadbed grading, car spotting, and loading and unloading at the siding. With the new shoes the crawler can mount or dismount the rails without injuring them. The company reports that the shoes do not affect normal every-day tractor performance.

Further information may be secured from the company by requesting Bulletin 190. Or use the Request Card at page 16. Circle No. 170.

Improved Eye Bolt

An improved eye bolt designed to carry weights heavier than those possible with a conventional eye bolt is available from Robert H. Froom & Co., 1738 W. 81st St., Los Angeles 47, Calif. This strength is achieved by the load-centering feature of the Froom eye bolt, which pivots to permit the weight to center. The bolts are said to be easy to install and use.

Made of high-grade steel, the eye bolts are ductile and tough, providing safety factors under intermittent strains and jerks, the company says. They are replaceable. Standard models are available in bolt sizes of $\frac{1}{2}$, $\frac{3}{8}$, $\frac{1}{4}$, $\frac{3}{16}$, and 1 inch with USS threads. Special sizes and SAE threads are also made.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 161.

Bulletin on Bulldozers

"Let's Talk Bulldozers" is the title of a new 16-page booklet issued by Caterpillar Tractor Co., Peoria 8, Ill. It illustrates how easy adjustments of dozer tilt, angle, and pitch may be made to boost production records.

Caterpillar dozers are available in 26 different models for tractors ranging from the 32-hp D2 to the 130-hp D8. Cross-section photographs illustrate both the cable and the hydraulic-control units. There is a chart breakdown of the optional D8 transmissions providing special reverse speeds for various job applications. Also included are highlights of the new U-shaped bulldozer, the service features of Caterpillar dozers, and testimonials of users.

This literature may be obtained from the company by requesting Form 30157, or by using the Request Card at page 16. Circle No. 201.

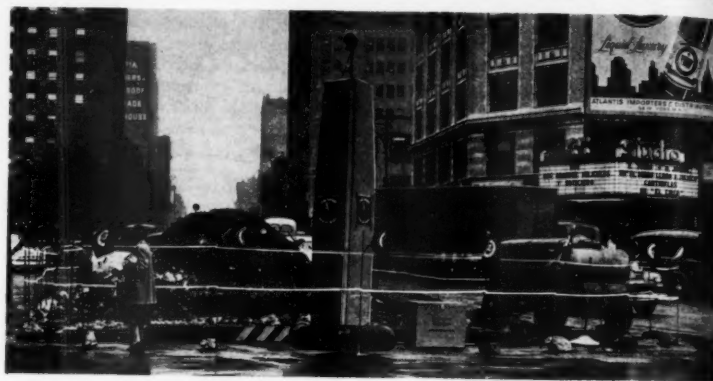
Heil Promotions

John Barclay has succeeded William E. Simons as General Sales Manager of the Heil Co., Milwaukee, Wis. Mr.

Barclay has been with Heil for over twelve years as a sales representative and District Manager in Seattle, Wash., and Hillside, N. J. William Schumacher, Sales Representative at Hillside, N. J., has been named District Sales Manager for that area. Robert Miller, District Sales Manager at Kansas City, Mo., is now Sales Manager of the Road Machinery Division. Ralph Nitz, Sales Representative in Dallas, Texas, has stepped into Mr. Miller's former job.

Twelve-Foot Pylons For Warning Signals

Portable street and highway warning-signal pylons to protect workers are being made by The Goodyear Tire & Rubber Co., Akron 16, Ohio. Made of an inflatable rubberized fabric, they can be erected quickly and equipped with flashing signal lights. The pylons are 6 or 12 feet high when inflated. Deflated, they can be packed in a small



A Goodyear warning-signal pylon is used by Consolidated Edison Co. of N. Y. on a Manhattan street. The case in which the deflated pylon is kept stands beside it.

container for carrying or storage.

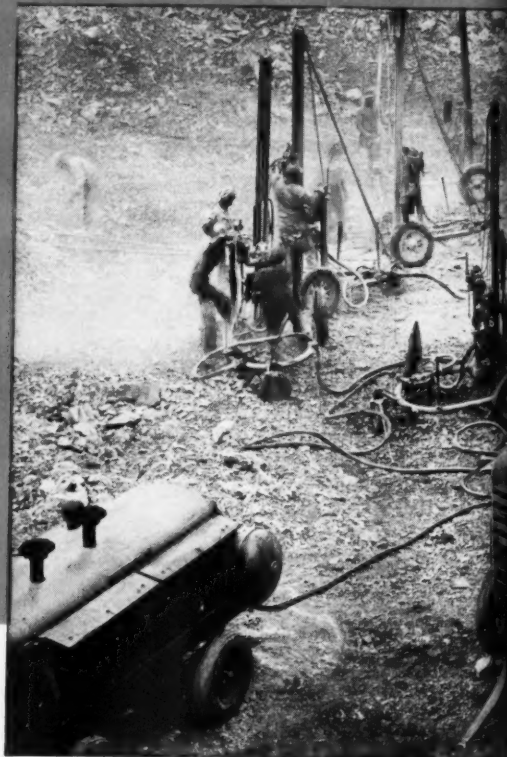
Two air chambers bonded together form an approximate right angle when the pylon is inflated. Cross-supports at the back, to which electrical connections for flasher lights or other illumination may be attached, increase rigid-

ity. The base, which should be filled with water, is made of rubberized fabric and resembles a small life raft. Light colors increase visibility.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 126.

Better air compressor performance **ALL** operating conditions

...with
TEXACO
air
compressor
oils



Whatever your operating conditions or the size or type of your compressors, there is a Texaco air compressor oil *exactly right* to assure trouble-free and economical performance. For example—
★★ If *rust* is your problem, use a Texaco *rust-inhibited* air compressor oil. It will keep your compressors, intercoolers, aftercoolers, lines and receivers free of rust.

★★ If *carbon and gum formations* are causing trouble, use a Texaco *heavy-duty* air compressor oil with special detergent and oxidation-resistant properties. It will keep compressors clean under severest conditions.

★★ If *moisture is condensing* in cylinders and washing off your lubricant, causing excessive wear, a Texaco *compounded* air compressor oil

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TEXACO STAR THEATER
starring MILTON BERLE
on television
every Tuesday night.
See newspaper for
time and station.



TEXACO

Scales Safeguard Roads of Arkansas

Arkansas has built 7 new weighing stations as part of an \$80,000,000 program to improve roads. The state's major concrete highways, built to withstand no more than 16,000 pounds per axle, were severely damaged by the increase in commercial trucking and by military traffic during the war years. After the war, the state voted an \$80,000,000 bond issue for a 4-year road program. Highways built under this program are designed to carry 18,000-pound axle loads. This limit, says Arkansas Chief Engineer A. E. Johnson, permits road construction at reasonable cost and the profitable operation of over-the-road freight carriers.

The seven weighing stations are built at the main entries to Arkansas. The most strategic location is occupied by two stations which straddle the highway at West Memphis, controlling U. S. 61, 63, 64, 70, and 79. More than 1,000 trucks are weighed in 24 hours



An auto transport is checked at the West Memphis, Ark., weight station. The rear wheels of the trailer are on the scale platform and weight is recorded automatically inside the station. This station is one of seven in the state.

at these stations.

Each of the seven stations has Type S Fairbanks-Morse axle-load scales of 25-ton capacity with a 10 x 10 weighing

platform. When a truck rolls up to the station the inspector switches on a red signal light to tell the driver his first set of wheels is on the platform. He



Each of Arkansas' seven weighing stations has a Fairbanks-Morse Printomatic 50,000-pound-capacity scale.

then flicks a switch to let the dial register the weight, turns the signal to green to move the truck and bring its next set of wheels to the platform, and again checks the weight. If gross weight or axle load is above the legal limit, the vehicle is immobilized until the load is reduced.

Some of the stations double as tourist information centers and several include an office for the State Revenue Department county collector. Some of them also serve as headquarters for the State Highway Department and the State Police.

Motor-Grader Story Told by Color Slides

Motor graders aren't bought in a hurry, and almost invariably a number of people have a voice in their selection. W. A. Riddell Corp., Bucyrus, Ohio, brings the Warco 4D Series motor grader before such groups with a series of 32 color slides—photos, diagrams, and tables.

The series reminds prospective customers that Riddell built the first motor grader in 1921 and the first hydraulically controlled motor grader in 1926. It then gets down to today's 4D Series machine. Diagrams help to explain the continuous-member frame, the balanced weight distribution, the high front-axle clearance, and the centralization of controls. Comparative tables list the advantages the company claims for the big tires on the 4D. Action photos and closeups show how the 4D Warco is operated and how it performs in the field. They highlight the flexibility of blade positioning without manual adjustment, which makes it possible for the operator to shift from 90 degrees on one side to 90 degrees on the other without leaving his cab.

Arrangements for viewing the slides can be made by writing the company, or by using the Request Card at page 16. Circle No. 210.

Yaun Dragline Buckets

A 4-page folder describes and illustrates the heavy, medium, and light-duty dragline buckets made by Yaun Mfg. Co., Inc., P. O. Box 1508, Baton Rouge, La. Yaun's line includes shell-type, basket-type, and perforated-type buckets, and the newer Yaun ditching bucket. The basket buckets have large holes to permit work under muddy and soggy conditions. The perforated buckets can be ordered with any size of holes. The buckets are all-welded and complete with manganese fittings and chains.

The ditching bucket for work on irrigation and drainage ditches is designed to permit digging at an even depth without difficulty. Its sides are sloped and may be ordered in sizes to suit particular jobs.

This literature may be obtained from the company, or by using the Request Card on page 16. Circle No. 124.

performance under conditions...



LONGER DRILL LIFE

For longer drill life and more footage drilled at lower cost, use *Texaco Rock Drill Lubricants EP*. These "extreme pressure" lubricants give full protection against wear and rust under severest conditions.

will overcome the difficulty.

★★ If your concern is merely to assure clean operation and reduce wear under *normal conditions*, a *Texaco straight mineral* air compressor oil will do an excellent job.

A *Texaco Lubrication Engineer* will gladly help you select the right air compressor oil for your requirements. He'll also be glad to tell you

how the *Texaco Simplified Lubrication Plan* enables you to handle all your major lubrication with only six *Texaco Lubricants*. Just call the nearest of the more than 2,000 *Texaco Distributing Plants* in the 48 States, or write:

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The Texas Company, 135 East 42nd Street,
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Traffic Engineering Has Role in Defense

Massachusetts DPW Plans System of Evacuation Routes and Control Stations; Highway Program Keyed to Traffic Study

• SINCE 1935 traffic engineering has played a major role in highway planning programs of the Massachusetts Department of Public Works. In the Bay State traffic facts and needs have long been considered of prime importance in both construction and maintenance activities. Now in a period of what is termed at high levels a national emergency, the traffic engineer is given new duties including the mapping out of evacuation routes, and establishing traffic-control stations throughout the state.

Already 18 such routes have been designated in Massachusetts from the eastern seaboard west to the New York border. For if possible enemy action is directed against New York City, these routes in western Massachusetts would be essential for the mass evacuation of the populace. The evacuation routes, assigned for civilian use, are being well marked out with signs 6 feet high x 11 feet wide. The military has been given other paralleling routes for its exclusive use. Even in large metropolitan areas this separation of traffic is not expected to result in conflict, according to the traffic engineers. Massachusetts has been employing different-colored signs to mark the way of the many traffic routes through its big cities, and motorists are now used to and appreciate the quick direction they give. Rear-end collisions have lessened, too, with fewer drivers stopping at busy intersections to find their way.

In this new emergency assignment, the Traffic and Maintenance Division of the DPW can be considered a part of the Massachusetts Civil Defense Agency covering rescue transportation evacuation. In this capacity the Division has compiled a thorough inventory of construction machinery possessed by contractors, cities, and towns, as well as highway departments both state and local. Not only highways are brought into this organization, but all modes of transportation—marine, railroad, and air lines.

Traffic-Control Stations

Traffic-control stations, numbered from 1 to 1,400, are scattered throughout the state on these important highways. Headquarters maintains contact with the stations, and can dispatch equipment and police to them as needed. Through these key spots military convoys can be re-routed or divided into smaller units to meet the exigencies of a situation. Normally they are used to perform the function for which they are named: traffic control.

Despite the stepped-up tempo due to civil defense, the Traffic Engineering Division proceeds as usual with its normal routine that has nothing to do with military operations. Regular activity is divided into six principal categories:

1. Operations and control which covers traffic signs, signals, and white dividing lines that define the traffic lanes on the pavement.
2. Analyzing traffic accidents with the purpose of remedying, if possible, the situation that caused them.
3. Giving aid to cities and towns as consultant adviser on such problems as arise from the regulation of traffic.
4. Assisting in the functional design of the state's highway system.
5. Research and studies covering diverse subjects such as parking meters, speed controls, pavement types, etc.

6. Planning surveys whereby the Division functions as a fact-finding agent for the DPW.

From information secured under this last-named function, the Traffic Engineering Division obtains the data necessary for the proper design of

highways.

Origin and destination surveys of traffic in the large urban areas determine directly the places between which people desire to go, in contrast to the complicated and indirect routes usually followed, which result in much of the traffic congestion found in all large cities. From these data, the need for and location of a system of expressways is determined which will be the relief valve for the congested traffic conditions strangling our cities today.

These traffic principles have many concrete examples in the number of master highway plans that have been developed in several cities of the state, including Boston, Cambridge, Worcester, Springfield, New Bedford, and Leominster. On the complex Central

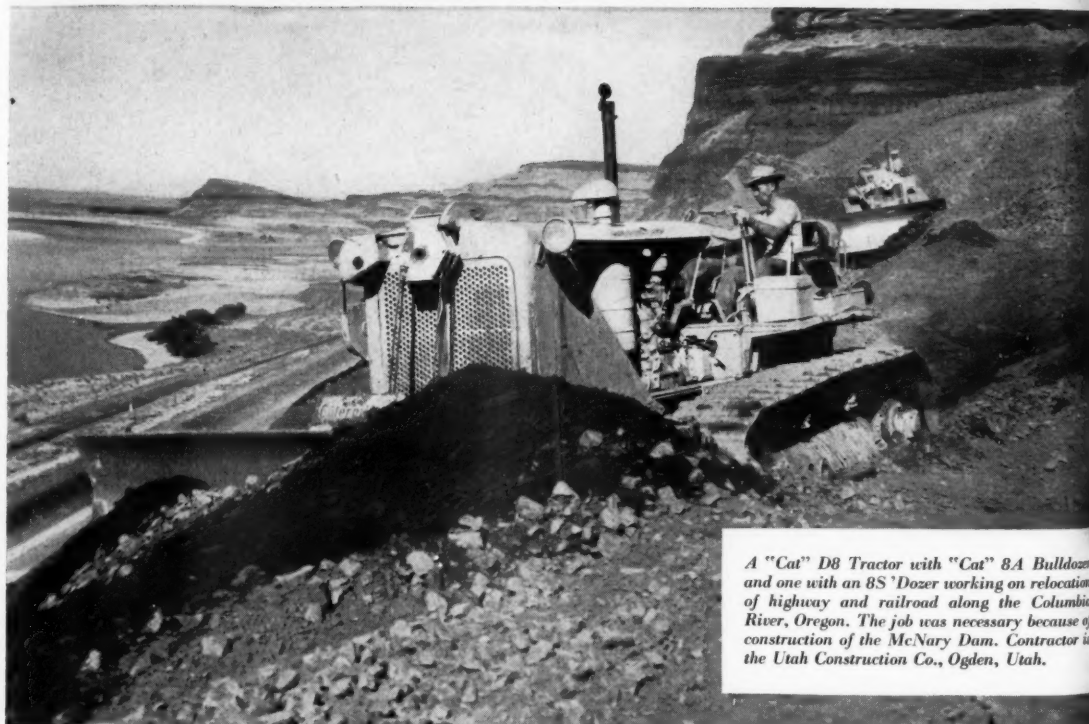
Artery of Boston, the Traffic Division also acted as liaison and expeditor on the project right up to the time of construction.

Massachusetts a Forerunner

By weighing all factors, the traffic engineers come up with a policy and program for constructing or improving highways that is based partly on the principle that a straight line is the shortest distance between two points, partly on the economic savings that would result from fewer delays to traffic, and partly on the lessening of accidents due to a safer design. On the economic side, the rehabilitation and development of land is not overlooked in highway planning.

(Concluded on next page)

There's a big



A "Cat" D8 Tractor with "Cat" 8A Bulldozers and one with an 8S Dozer working on relocation of highway and railroad along the Columbia River, Oregon. The job was necessary because of construction of the McNary Dam. Contractor is the Utah Construction Co., Ogden, Utah.

IF YOU WANT TO HELP YOUR COUNTRY— AND YOURSELF AT THE SAME TIME— READ EVERY WORD ON THESE TWO PAGES

Keeping equipment *on the job* is of prime importance today—to the nation as well as the contractor. The Military plans to spend 8 to 9 billions on construction in the next 18 months. And a production *backlog* of 52 billions was carried over into 1951 for bridges, roads, earthwork, government work, waterworks and other essential projects.

Right now there is a shortage of materials with which to build urgently needed machines and parts. Military and Defense Rated Orders get the nod over unclassified civilian needs. Steel and other materials are in short supply. This means that you—with our help—must get every last machine-power hour out of the equipment and parts you now have.

Down-time will not only weaken the defense effort, it can put the contractor himself in the hole. To get future business, he must get current jobs done without penalty or sacrificing his bond. Down-time means bad distribution of equipment; it means costly damage to equipment forced to do work it's not built to handle.

So to stay in business profitably, and help America arm for defense, do these things now:

- 1 Use equipment properly. "Cat" machines are built for hard use—not abuse.
- 2 Give extra attention *now* to preventive maintenance (see next page).
- 3 Have your equipment superintendent plan ways and means with your "Caterpillar" dealer. His maintenance responsibility begins where your operators' and mechanics' responsibility ends. He has the skilled servicemen and equipment to rework and rebuild worn parts to keep your machines on the job longer.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



The last war showed the Military that "Cat" Earthmoving Equipment was as important to defense and offense as tanks. Here Sgt. Robert Christman operates a "Cat" D8 Tractor with matching blade on Davison airstrip at Ft. Belvoir, Va.

Massachusetts has long been conscious of the importance of the traffic engineer to the overall highway picture, and unlike many other states has been a forerunner in recognizing the value of the work he performs. Edgar F. Copell is Executive Assistant in charge of the Traffic and Maintenance Divisions. He is a ruddy-faced dynamo who has been with the Department 25 years, and is keenly interested in getting other highway department administrators to raise the status of their traffic engineers to the Massachusetts level.

Traffic Setup

While the 51-year-old Copell supervises a division that includes everything from snow removal to roadside devel-

opment, it is traffic engineering that he eats, sleeps, and breathes. In the Boston headquarters of the Massachusetts Department of Public Works, there are 37 graduate engineers in the Traffic Division—men with a variety of experience in all branches of highway work. In addition there are others in the classification of traffic counters, checkers, and inspectors working out of the main office. A traffic engineer is also located in each of the seven district offices with from two to four assistants. District offices are in Pittsfield, Greenfield, Worcester, Brighton, Beverly, Taunton, and Middleboro.

These traffic men have their finger on the public pulse more than any other group of engineers, probably, in the state. They have built up good pub-

lic relations in many little ways, such as the initiation of the courtesy detour signs that are erected where the motorist comes in contact with a construction project that may cause him delay or inconvenience. Business men are more interested in traffic than is commonly realized, and are ready to ask for advice from the state experts on parking, access, and allied problems. The traffic engineer has been of assistance to the department-store owner, the hotel manager, and the theater operator.

From the vital part that traffic engineering plays in the Massachusetts Department of Public Works, it is understandable why Ed Copell would like to see other states reap the advantages that may be expected from a sound

traffic plan. The days are long past when traffic control ended with the painting of white lines down the middle of the road.

New 3-Yard-Capacity Concrete Truck-Mixer

A new lightweight 3-yard-capacity truck mixer has been engineered by Concrete Equipment Mfg. Co., 5437 Tweedy Blvd., South Gate, Calif. The Champion weighs 4,200 pounds and has a reserve capacity up to ¾ yard. Its height is 76 inches from the base of the frame to the highest point—with an additional 5 inches for a hopper loader.

The mixer is powered by a 4-cylinder Ford industrial engine through an angle worm drive and roller chain for final drive. The drum is made of ¼ and 3/16-inch abrasion-resistant Corten alloy steel, electrically welded and machined after fabrication. A 68-gallon-capacity supply tank and engine-driven centrifugal pump constitute the water system. Both drum and engine can be fully controlled from either end of the mixer. The discharge chute is adjustable in length, slope, and direction.

The unit also features 3-point drum suspension, an alloy-steel main shaft carried on self-aligning roller bearings, lubrication through six easily accessible grease fittings, and a removable loading hopper for overhead bunker or conveyor charging. The mixer mounts on any standard 2-ton truck chassis.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 143.

Hydraulic Pumps, Controls For Mobile-Type Equipment

A 16-page catalog on Vickers hydraulic pumps and controls for mobile equipment in the construction industry is offered by Vickers, Inc., 1492 Oakman Blvd., Detroit 32, Mich. It illustrates and describes Vickers hydraulic pumps, multiple-unit valves, steering boosters, power packs, and motors, and gives specifications, charts, and design details. Detailed installation drawings and reference data may be obtained upon request.

Drawings illustrate Vickers equipment in use on trucks, motor graders, tractors, fork trucks, rollers, snowplows, dirt wagons, and other road machinery. The text lists equipment features—fully enclosed systems, simplicity of installation, flexibility of control, and protection against abuse and overloading. Charts and tables assist in the selection of proper equipment.

This literature may be obtained from the company by requesting Catalog M-5100, or by using the Request Card at page 16. Circle No. 125.

Scales for Construction Use

Two new bulletins, one on dial scales and the other on truck and trailer scales, have been prepared by The Howe Scale Co., Rutland, Vt. Form 666 covers a "scale for every weighing purpose" including the company's line of bench scales, cabinet dial floor scales, pitless suspension scales, crane scales, portable platform scales, tank scales, and remote weight-recorder scales. It also describes the Dash-Pot control, the tare-beam assembly, the tape-drive dial mechanism, and other scale components.

Form 441-B covers Howe 4-section truck and trailer scales. A large cross-section drawing illustrates component scale parts, pointing up salient construction features. This is supplemented by a detailed description of each assembly. The scales are available in several platform sizes and with capacities up to 50 tons.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 109.

Job ahead!

You're

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Doctor

bulldozer
location
Columbia
cause of
actor is

day no owner can afford
think of direct costs alone.
care of equipment can mean
difference between a
producing machine and one laid
for repairs. To see how
care can save many hours
equipment life, reread your
Operator's Instruction Book often
follow these suggestions.

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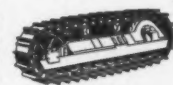
• DUST

Think of dust as Machine Enemy No. 1. A few grains today—a few more tomorrow—and soon the result adds up to serious wear. Dust or dirt plugged breathers or air cleaners—use of dirty oil containers—loose intake manifolds—loose inspection covers—dirty clutch compartment—failure to wash flywheel clutch compartment—worn seals on crankshaft—defective gaskets—failure to clean oil filter openings . . . these are some of the vulnerable spots.



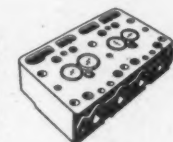
• TRACK ASSEMBLY

Don't let abusive use or neglect cripple the service life of your track assembly. Track adjustment and lubrication of rollers, carrier rollers and idlers are your job. Before excessive wear occurs on grousers, links, pins, bushings, idlers, rollers and sprockets, call in your "Caterpillar" dealer. He can build up grousers, rollers, idlers and links, and replace sprocket rims and turn pins and bushings so you will have many additional hours of service.



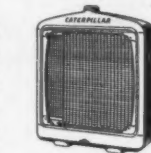
• CYLINDER HEADS

Prevent cracked cylinder heads by avoiding overheating, freezing, scale deposits, filling a hot engine with cold water, pulling heads down too tight, and other poor maintenance practices. Your "Caterpillar" dealer can repair most cracked cylinder heads. He can replace worn valve seats with valve inserts and restore the rocker arm mechanism to serviceable limits. Consult your Operator's Instruction Book for proper cooling system and valve care.



• COOLING

Don't let your engine overheat. Keep the cooling system free of scale, rust and sediment. Use soft or treated water, and when freezing temperatures exist, protect your engine with anti-freeze. Clean the radiator regularly with chemical flushing solutions. Remove foreign matter from the core by brushing or washing. Prevent engine troubles which come with overheating. Consult your Operator's Instruction Book for proper cooling system care.



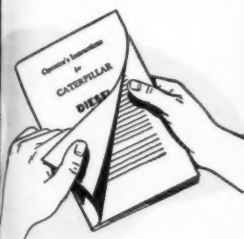
• LUBRICATION

Careful lubrication practices will add much to your satisfaction through equipment performance, economy and long life. Use only recommended lubricants, changing the lubricant at proper intervals. And use only "Caterpillar"-proved filter elements. Remove dirt from fittings and clean around the crankcase filler cap before adding oil. A little care saves many hours of engine life. Consult the lubrication chart in your Operator's Instruction Book.



• PISTONS AND LINERS

Almost all the piston wear occurs in the upper ring groove. Your "Caterpillar" dealer can renew your pistons by machining the upper ring groove for a wide ring, many sizes of which are chrome plated. Worn liners can be deglazed and put back to work for many additional hours of service life. Consult your Operator's Instruction Book for information on lubrication and the oil cooling system.



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DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT



Low toe height, a large forged toe and trip that can be operated from left or right are features of the new Simplex single-acting track jack, Model 16A. It has a capacity of 15 tons.

New Jack for Spur, Switch Maintenance

A new Simplex single-acting track jack, Model 16A, has been introduced by Templeton, Kenly & Co., 1006 S. Central Ave., Chicago 44, Ill. It is designed to speed up and simplify maintenance work on switches and spurs as well as on temporary tracks used in construction projects. Among its features is a minimum toe height of 1½ inches. This enables the jack to be placed under rail without removing ballast. The large forged toe, 2½ x 3¼ inches, stabilizes the load. The trip can be operated from either the right or left side, with the operator protected in each case by an improved safety thumb guard. Over-all height of the new jack is 12 inches, lift 6 inches. It weighs 45 pounds and has a capacity of 15 tons.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 180.

American Tractor Expands

American Tractor Corp. has completed the construction of two buildings, each with 15,000 square feet of space, on its 32-acre site in Churubusco, Ind. The buildings are completely fireproof and have masonry walls and solid concrete roofs. They will make it possible for American Tractor to triple its production capacity.

RUEMELIN BLAST GENERATORS

FOR CLEANING BRIDGES — WATER
TOWERS — STRUCTURAL STEEL

Many contractors use Ruemelin Blast Generators for cleaning steel work to remove rust, paint and scale before repainting. These machines are also used to remove laitance from cement wherever concrete construction is in progress. A wet adapting nozzle can be furnished to convert dry machines to wet type of operation. Built in several sizes.



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for
Bulletin
36-B

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MFG. CO.

3848 N. Palmer St., Milwaukee 12, Wis.
Manufacturers and Engineers
SAND BLAST AND DUST COLLECTING
EQUIPMENT, WELDING FUME COLLECTORS

Data on All-Steel Clamps Used With Wood Curb Forms

Construction of concrete curbs on an existing slab, without drilling holes through the pavement, is treated in a bulletin issued by Pacific Engineering Sales Co., 215 W. Fifth St., Los Angeles 13, Calif.

The bulletin describes and illustrates Pacific clamp setups for all standard curb jobs and shows special applications. These two-piece all-steel self-locking clamps are used with wood curb forms and are said to handle any type of curb in general use. They are adjustable for curb widths of 4 to 10 inches, heights up to 36 inches, and any batter, the literature says, and they eliminate nailing, save lumber, and make possible faster setup and take-down.

This literature on Pacific self-locking clamps may be obtained from the company by requesting Bulletin 151, or by using the Request Card at page 16. Circle No. 204.



Bent steel sheet piling helped Subterranean Corp., New York, overcome difficult soil conditions during construction of the south interceptor for the \$18,000,000 Owl's Head Sewage Works in Brooklyn, N. Y. The interceptor consists of 8,500 feet of cast-in-place reinforced-concrete conduit 9 x 9 and 8 x 8½ feet inside diameter. L. B. Foster Co. supplied the piling.

DEWALT

used for precision cutting in building the

STATLER CENTER

LOS ANGELES



Statler Center, now being built in Los Angeles, is the largest hotel that has been erected in the last 20 years. It will cost, when completed, \$20,000,000.

Helping to build this mammoth project were 4 DeWalts, used for a variety of cuts in the construction of the concrete forms. DeWalts were the only radial saws used on the job.

DeWalt's speed, precision and accuracy are being constantly utilized at lower cost by contractors in the building of hotels, apartments, hospitals—for machine or carpenter shops located on the construction operation of bridges, locks, dams, factories, defense plants, military and defense housing.

Investigate DeWalt! Learn what this all-purpose machine can do for you. Models range from ½ H.P. (for light cutting) to 7½ H.P. (for heavy duty cutting). Write for catalog: DeWalt, Inc., Dept. CM-6, Fountain Avenue, Lancaster, Penna.

DEWALT INC.

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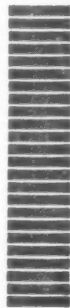
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Dual Concrete Road For City Approach

New Location on an Old Streetcar Right-of-Way Replaces a Congested Two-Lane Highway at Huntington, W. Va.

TRAFFIC from the west approaching Huntington, largest city in West Virginia, will appreciate the new 2.019-mile dual reinforced-concrete highway replacing the original two-lane road that had long been too narrow for safety and service. This improvement on U.S. 60 lies in Wayne County, and extends from Twelve Pole Creek Bridge to the Cabell county line. The new location is on the former right-of-way of an old electric trolley line that ran from Huntington west 16 miles to Ashland, Ky. At both ends, the new stretch of pavement ties back to the existing U.S. 60 that lies to the south and farther back from the left bank of the Ohio River. Grading operations got under way in February, 1950, after the West Virginia State Road Commission awarded a contract for the work to W. H. Ringwald & Sons Co., Inc., of Chillicothe, Ohio, on its low bid of \$557,295.70. By August 22 the roadbed was in shape to receive the first bucketful of concrete. With favorable weather the contractor had hoped to finish the paving before the end of the construction season. However, unusually severe weather conditions required suspension of work in November, 1950. Work was resumed this spring with expected completion in early summer.

Dual Highway

Built on a slight fill throughout its length, the new section of highway has a sand-gravel base course of 4-inch compacted thickness. On either side of a 4-foot concrete-paved median are 24-foot concrete roadways laid in 12-foot lanes. Along the north or river side, where a row of houses parallels the road, another lane of concrete, 8 feet wide, adjoins that side of the dual highway. The narrower lane may be used as a parking strip, thus keeping cars off the traveled way. It is flanked by a 6-inch curb and a 4-foot concrete sidewalk. Enough land is available for laying another lane, 10 feet wide, at the side of the opposing pavement; this is now a 10-foot stabilized shoulder constructed of the base-course material.

All the concrete is 8 inches thick, and reinforced with steel mesh embedded 2 inches below the surface. Transverse contraction joints in the pavement are spaced on 31-foot centers, with an expansion joint placed every 589 feet. Longitudinally the adjoining lanes are tied together both with keyways and with $\frac{5}{8}$ x 12-inch hook bolts on 5-foot centers. The keyways are formed by bolting wooden strips to the inside faces of the steel forms, and the hook bolts slip through holes burned in the sides of the forms with a torch. They project 6 inches into each of the adjoining slabs.

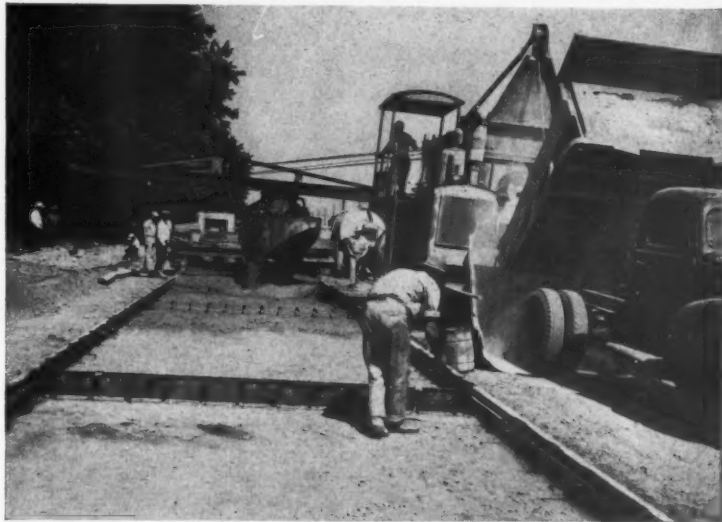
Drainage

The pavement slopes away from the

median strip on a 2-inch straight crown for each 12-foot lane. Under the outside edges of the roadways, and in the median strip, are 6-inch perforated helical corrugated-metal pipe underdrains.

There is a twin 6 x 8-foot reinforced-concrete culvert 83 feet 10 inches long for Kraut Creek near the center of the project. For roadway drainage, 18 or 24-inch RC pipe was laid under the median strip from the junction with the old pavement at the west end to the east end of the project, emptying into city

(Continued on next page)



C. & E. M. Photo

An expansion joint goes in on U. S. 60 approaching Huntington, W. Va. Behind it is a contraction joint and the MultiFoot 34-E Duomix paver.

Pull the chain to flush... Air operated Gar-Bro concrete buckets

ELIMINATE HOSE, connectors and air supply equipment at the dumping location with the new Gar-Bro Concrete Buckets. Control valves and high pressure air supply tank are now integral equipment. You can charge the air when you charge the bucket and pull the chain to dump a full load or any part. Available on all sizes of Gar-Bro Buckets including the dual-4, two-compartment.

Write for information.

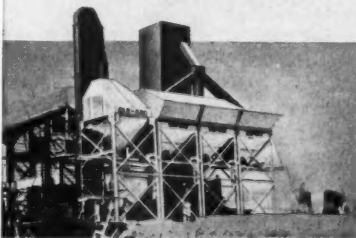


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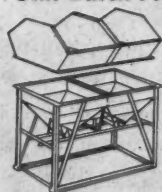


Buckets

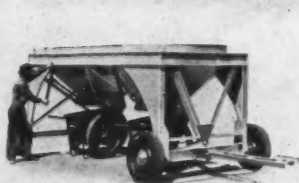
World's most complete line—25 models ranging from $\frac{1}{4}$ to 8 cu. yd.



Unit Batch Plants



A variable combination of portable aggregate and cement storage bins with traveling weigh hopper.



Hoppers

Includes portable, tower and floor hoppers (28 models) with cap. to 10 cu. yd.

Chutes

A complete line of concrete collection hoppers, steel drop chutes, rubber elephant trunk & line chutes.



Carts

Power-carts with concrete tray, box tray or platform (cap. up to 14 cu. ft.—2000 lbs.). Also six models of hand-push concrete carts.

Barrows

complete line (35 models) with steel or aluminum trays and with wood or steel handles.



Bin Gates and Weigh Hoppers

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BLUDWORTH RECORDER

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write for catalog

Dual Concrete Road For City Approach

(Continued from preceding page)

storm sewers at street intersections or new transverse structures. Manholes and median-strip drop inlets were placed over this median-strip pipe, with lateral 18-inch RC pipe connecting curb inlets on the north side and drop inlets on the south side with the main median-strip pipe. These lateral drains were spaced some 200 to 300 feet along the project.

Batch Plant

The contractor set up a concrete batch plant at the west end of the job, close to a bluff overlooking the Ohio River. Sand and two sizes of gravel for the aggregate were supplied by the Ohio River Dredging Co. of Huntington, which delivered the material to the plant. It came by barge, and was unloaded by a derrick boat into a hopper bin at the edge of the water. From the hopper the aggregate was raised up the bank on a series of conveyor belts, and distributed into three stockpiles. A P&H crane with a 50-foot boom and an Owen 1-yard clamshell bucket picked up the material and charged the Heltzel 100-ton 3-compartment aggregate bin.

Air-entrained bulk cement came from the Alpha Portland Cement Co. plant at Ironton, Ohio, located downstream from the project and on the opposite side of the river. The Goldkamp Sand & Gravel Co. of Huntington delivered the cement after a 14-mile haul in covered trucks. It was dumped into a hopper, and moved by a worm gear and enclosed elevator to a Blaw-Knox cement bin holding 400 barrels. A supply of bag cement was also kept on hand to finish a pour in case the bulk supply ran short.

The two bins were laid out in line so that the batch trucks ran under both while loading, without having to back up. Batches were hauled in seven trucks, each holding two batches. The usual procedure was to have the trucks first pick up the aggregate, then get the cement which was carried in separate metal containers. The weights of a typical batch of concrete, yielding 37.5 cubic feet, were as follows:

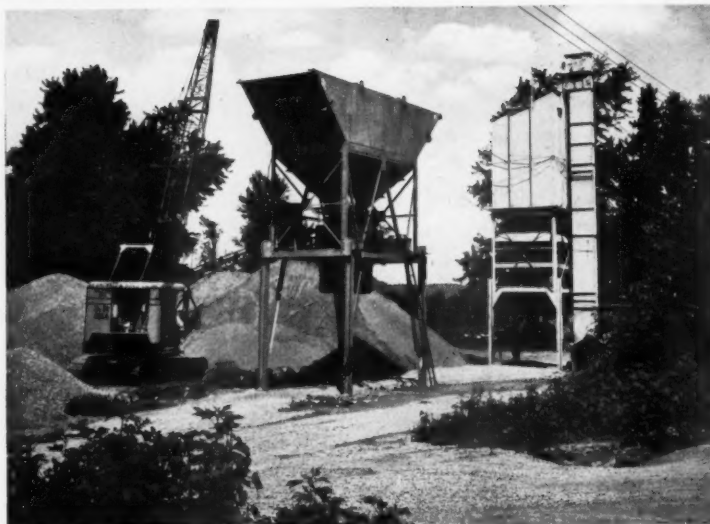
Cement	850 lbs.
Sand	1,500 lbs.
Gravel	2,834 lbs.
Water—40 gals.	332 lbs.
Total	5,516 lbs.

Paving 12-Foot Lanes

After the base was shaped practically to grade by a Galion motor grader, the forms were laid in 12-foot lanes after a Cleveland Formgrader had opened up long shallow trenches. A total of 6,300 linear feet of Heltzel forms were at hand on the job, and the contractor strove always to keep ahead of the paver 1,000 feet of forms and fine-grading. Excess material between the forms was removed by a Flynn Finegrader, and the base course was checked for depth and rolled by a Galion 10-ton 3-wheel roller.

Since the paver worked outside the forms, the transverse joints were set as soon as the forms and grade were ready. The Bethlehem Steel Co. supplied the joint assemblies, dowels, and reinforcing steel mesh for the slabs. Dowels for the transverse joints are 1 x 19-inch, and are set on 12-inch centers. At the expansion joints the Serviced Kork-Pak material is ¾ inch thick, and was capped with a metal channel during the paving operations. Forms were oiled and the subgrade wet before paving started.

Batches were mixed for 1½ minutes in a MultiFoote 34-E Duomix paver equipped with a 35-foot boom. Water for the concrete was tapped from city hydrants into a Ford 1,000-gallon tank truck that hauled it to the job site. There it was transferred into a 2,000-gallon trailer tank that was pulled along by the paver. When the transfer was being



C. & E. M. Photo

At Ringwald's batch plant, a P&H crane with a 50-foot boom loads the Heltzel aggregate bin. Beyond is the Blaw-Knox cement bin.

made, the trailer also towed the truck behind it. As soon as the tank truck was emptied, it returned to a hydrant for more water. From the big trailer tank the water was pumped through a hose to the paver by a Barnes 3-inch pump mounted on the front of the trailer, and powered by a Le Roi gas engine.

Concrete Finishing

Concrete was deposited between the forms in front of a Blaw-Knox spreader that struck it off to the proper depth for the steel reinforcing. After the steel mesh was laid in place, more concrete was added to fill the forms and the spreader made another pass to level it off. A platform at the side of the paver caught the concrete that did not make the bucket, thus preventing mortar from hardening along the rear face of the forms.

Behind the mechanical spreader came a Jaeger dual-screed finishing machine and a Koehring Longitudinal Finisher. Steel strips at the contraction joints

(Concluded on next page)

on TOUGH jobs, this SUPER oil can

DOUBLE

BETWEEN OVERHAULS

KEEPS ENGINES CLEAN—NO STICKING RINGS

RETARDS WEAR—STRETCHES OUT ENGINE LIFE

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If your engines operate at high speed, high temperatures, under shock and overloads... or if they operate at low engine temperature because of light loads, long idle, lots of stop-and-start —there is a lubricating oil made for you —Sinclair SUPER TENOL.

Sinclair lubrication specialists developed this lubricant expressly to keep engines clean and lengthen engine life, under all operating conditions — heavy load... light load... or idle. And they succeeded! Operators report, using SUPER TENOL, they have more than doubled engine life between overhauls.

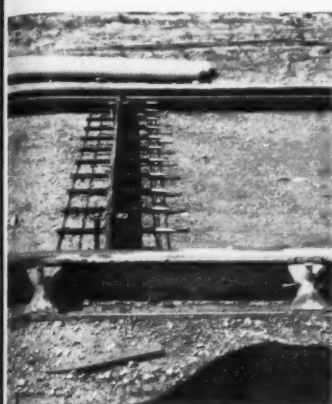
Figure what this can mean to you: cuts the overhaul downtime in half... more productive output per engine... lowered operating cost! Better plan to change to SUPER TENOL right away!

For lubrication help, see your local Supplier of Sinclair Products or write to Sinclair Refining Company, 630 Fifth Avenue, New York 20, N. Y.

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C. & E. M. Photo

Joint assemblies for the Huntington, W. Va., job were supplied by Bethlehem. This is an expansion joint.

were impressed into the concrete after grooves for them had been cut by a Cleft-Plane joint installer. Later the strips were removed by the finishers

after the concrete had attained its initial set. While the concrete was still moist, it was given a finish with a bur-lap drag. Joints were edged with a 1/4-inch-radius tool, and the concrete was cured with a membrane compound supplied by the Marietta Paint & Color Co. and applied from a Flex-Plane automatic spray machine. Joints were poured later with asphalt.

Concreting started at the east or Huntington end on the north lane, and proceeded in a westerly direction.

Quantities and Personnel

The major items on the 2.019-mile concrete-paving contract included the following:

Unclassified excavation	75,700 cu. yds.
Gravel subbase	16,850 cu. yds.
Concrete pavement	76,300 sq. yds.
Reinforcing	275,100 lbs.
Dowel bars	108,250 lbs.
Tie bars	12,550 lbs.
Plain-concrete curbs	19,750 lin. ft.
Integral curbs	13,500 lin. ft.
Concrete sidewalk	50,900 sq. ft.

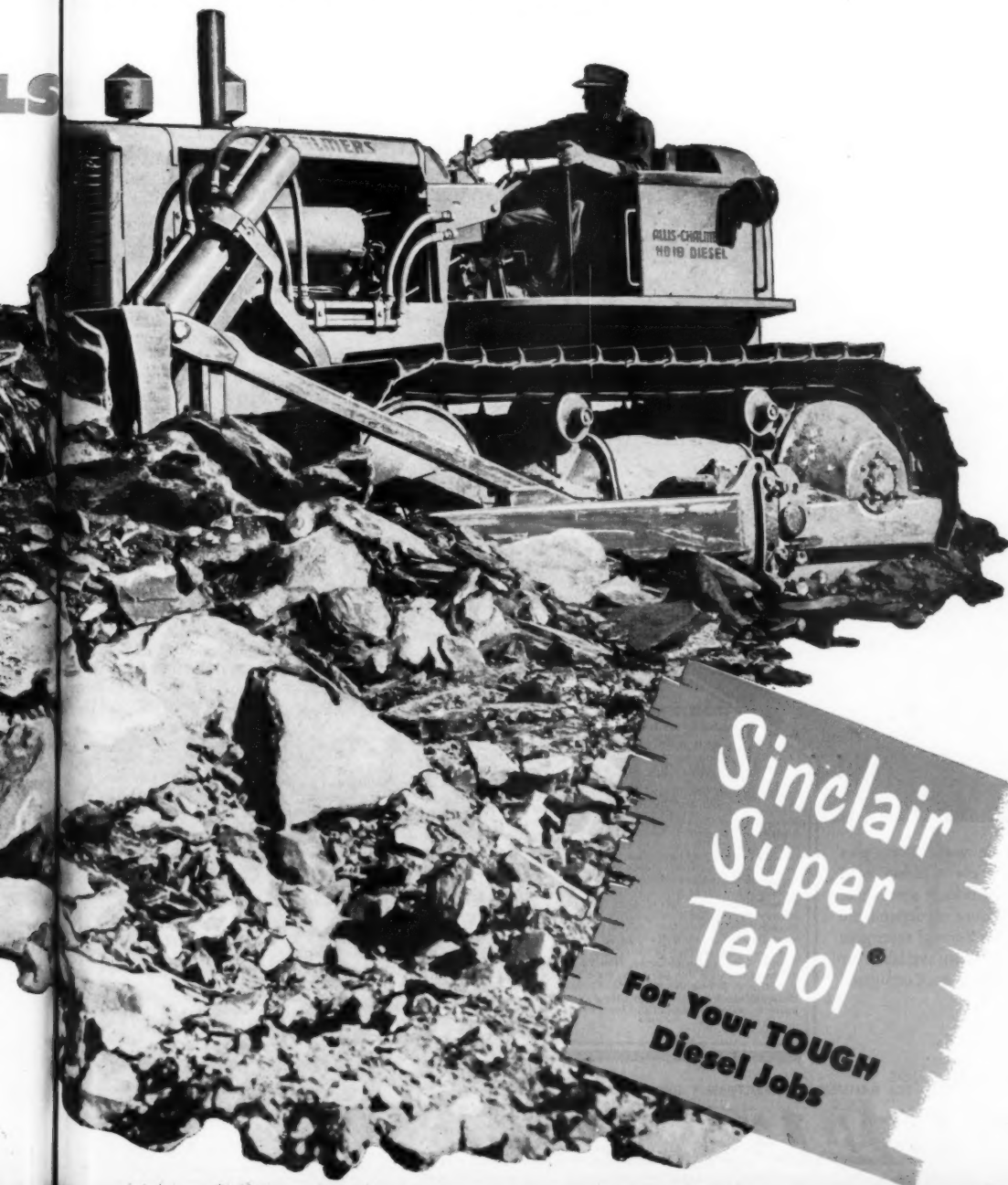
W. H. Ringwald & Sons Co., Inc., employed an average force of 100 men on



C. & E. M. Photo

Steel strips at contraction joints on Ringwald's paving contract were inserted from a Cleft-Plane joint installer.

ENGINE LIFE



the project. Robert Cutright was Superintendent on the grading, and F. W. Jacobs Superintendent on the concrete paving.

For the West Virginia State Road Commission, W. F. Tipton was Senior Engineer in charge of the job. The Commission is headed by Ray Cavendish, Commissioner; George W. McAlpin is State Construction Engineer. The project is located in the Huntington district of which J. N. Wallace is District Engineer and H. A. Levering is Senior Construction Engineer.

Underground Structures Installed by Tunneling

"It is not necessary to tear up pavements and disrupt business to install sewers and other underground structures", says a new folder telling how these jobs can be done by tunneling with Armco Liner Plate. Prepared by Armco Drainage & Metal Products, Inc., Middletown, Ohio, the folder points out that these lightweight plates can be installed with a minimum of excavation and that their design insures ample strength for a variety of uses. It tabulates the physical properties of the plates and pictures their use as water and utility-line tunnels, relinings for highway and railroad tunnels, and underpasses.

Armco Liner Plates reduce maintenance, the folder says; weather is no hindrance during construction; and they can be salvaged and re-used when installed as temporary tunnel lining.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 106.

Building-Design Handbook

"Computing Stresses in Rigid Frame Buildings" is intended for experienced designers. The text describes simplified methods for computing stresses due to vertical and lateral loads in multi-storied buildings where the girder-to-column connections are rigid or semi-rigid. Many examples and illustrations are given.

This revised, condensed, simplified, and indexed pocket-sized book is available on request from Lefax Publishers, Commonwealth Bldg., Philadelphia 7, Pa.

Fram Corporation News

Henry T. Parrett, who manages the Washington branch of Fram Corp., Providence, R. I., manufacturer of automotive filters, has been made a vice president of the firm. The company has expanded its engineering staff in Washington and Mr. Parrett has set up an Aviation Division headed by Charles L. Foley.

New Power Control For Tractor-Dozer

The Super C Tornadoizer is now available with torque converter and electric control, according to an announcement by R. G. LeTourneau, Inc., Peoria 1, Ill.

The torque converter is a single-stage type, which acts as an automatic hydraulic transmission, combining the features of a hydraulic torque converter and a hydraulic coupling. It transmits and selects the proper ratio for delivering power in a steady flow to the wheels, and provides a shock-load cushion between the engine and the drive wheels. Engine lugging is eliminated, the company says; this provides maximum torque when needed, particularly in starting, and smooth acceleration to all speed ranges, thereby cutting down tire slippage and wear.

The various gears in the constant-mesh air-actuated Tournamatic transmission are controlled by electro-magnetic valves. These are in the air lines



The Super C Tornadoizer is now available with torque converter and electric control.

going to the clutches which engage the transmission gears, and they are controlled by 4 push-pull switches on the dash panel. With finger-tip electric con-

trol, gear changes into higher or lower ratios are instantaneous, thereby eliminating loss of momentum, the company claims.

Another Tornadoizer development is that electrically controlled steering is now accomplished by use of a toggle switch on the control panel. The Tornadoizer is turned by pushing a toggle switch in the desired direction to actuate synchronized electro-magnetic valves in the air lines controlling the clutch and brake disks.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 177.

Water Feed for Saws

A water-feed attachment for Silver Line saws has been announced by Independent Pneumatic Tool Co., 175 State St., Aurora, Ill. It has 12 feet of $\frac{3}{8}$ -inch hose, a spray, and a standard coupling for a faucet or an extension hose.

The spray is a forked tube which fits around the saw blade and is held in place by a bracket fastened to the swivel base of the saw. Perforations in the tubes allow water to shoot against both sides of the cutting blade. The flow is controlled by a hand-operated shut-off valve in back of the spray attachment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 137.

Sets of Auger Bits

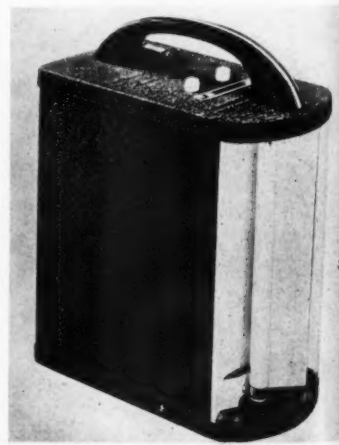
Two new 5-piece sets of Mirbrite auger bits for electric drills have been announced by The Midway Tool Co., Inc., Melvin, Ohio. The Handy Utility set consists of one each of $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, and $\frac{1}{2}$ -inch bits. The Mechanic's Special includes $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, and $\frac{5}{8}$ -inch bits. Sets are packed in leatherette rolls with each bit compartment labeled as to size.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 119.

Portable Floodlight

A new portable fluorescent floodlight which operates on self-contained or heavy-duty external batteries, or ac or dc current, has been introduced by Totelite Division, Paramount Industries, Inc., 111 Broadway, New York 6, N. Y. The Totelite features 180-degree floodlighting designed to illuminate all parts of the work area. Its steel case and plastic lamp shield are designed to withstand abnormal shock and rough handling. The unit weighs 8 $\frac{3}{4}$ pounds with internal batteries. These are two standard 45-volt B batteries which, the company says, will give approximately 45 hours of intermittent use. Two external heavy-duty 45-volt B batteries give approximately 400 hours of intermittent use. The Totelite measure 11 x 8 $\frac{3}{4}$ x 4 $\frac{1}{2}$ inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 142.



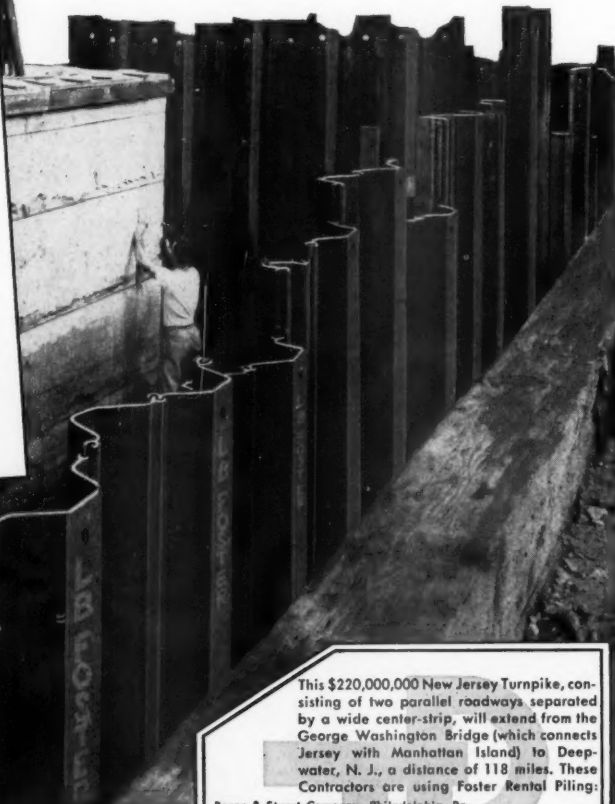
The Totelite is a fluorescent floodlight. It operates on ac or dc current, or on self-contained external batteries.

PILING RENTAL SERVICE FROM FOSTER IS TURNING TURNPIKE TROUBLES TO TRIUMPHS

Along the 118-Mile New Jersey Turnpike

SERVING 17 CONTRACTORS ON ONE JOB

Foster Piling Rental Service is assuring 17 major contractors of getting their piling on the job sites in advance of work schedules. In constructing such a tremendous traffic artery, countless troubles of every nature turned up; and thus Foster was the one dependable source to turn to to obtain the exact lengths and exact sections of steel sheet piling that each job required. When "man-made" problems are continuously encountered as in this job—and when major obstacles come up such as crossing the New Jersey tidal flats, you must be able to count on prompt dependable deliveries and Foster carries the largest Rental Piling Stocks in the country—all lengths and sections—in all standard makes.



This \$220,000,000 New Jersey Turnpike, consisting of two parallel roadways separated by a wide center-strip, will extend from the George Washington Bridge (which connects Jersey with Manhattan Island) to Deepwater, N. J., a distance of 118 miles. These Contractors are using Foster Rental Piling:

Brann & Stuart Company, Philadelphia, Pa.
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Geo. M. Brewster & Son, Inc., Bogota, N. J.
Cayuga Foundation Corporation, New York, N. Y.
Del Balso Construction Corporation, Bronx, N. Y.
Francis A. Canuso & Son, Philadelphia, Pa.
Franklin Contracting Company, Newark, N. J.
Grow Construction Company, Inc., New York, N. Y.
Jaggard Engineering Company, Westmont, N. J.
Linde-Griffith Construction Corporation, Newark, N. J.
Napp-Greco Company, Newark, N. J.
P. T. Cox Construction Company, New York, N. Y.
Pearless Construction Company, New York, N. Y.
Raymond Concrete Pile Company, New York, N. Y.
S. J. Groves & Sons Company, Woodbridge, N. J.
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Union Building & Construction Corp., Passaic, N. J.

With complete piling stocks in five nation-wide warehouses, plus numerous field stocks—Foster can service your every piling need with the exact lengths and exact sections of interlocking steel sheet piling—all makes and all types. You can always count on dependable delivery "FASTER FROM FOSTER"—and the low rental rates give you an added advantage in competitive bidding. Also available for immediate delivery from Foster: Rental Lightweight Corrugated Steel Sheet Piling, Pile Hammers and Pile Extractors.



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A valuable reference guide fully illustrated with tables, diagrams—pertinent facts and figures on all standard makes (all sections) of steel sheet piling, corrugated lightweight piling, pile hammers and pile extractors.

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With the new backhoe attachment and 105-cfm air-compressor capacity, the Tractair can be used as a tractor, an air compressor, or a light backhoe.

New Tractor Backhoe

A backhoe attachment for the Tractair makes this mobile unit a tractor, an air compressor, and a light backhoe. The Le Roi Co., 1706 S. 68th St., Milwaukee 14, Wis., recommends its use on digging jobs too small to warrant heavy power shovels, but too extensive to be done economically with hand la-

bor. With the Tractair's 105-cfm air-compressor capacity, air power is available for breaking pavement or frost, for clay-spade work, and for tamping. The combination also supplies the basic equipment for most small ditching jobs.

The Henry backhoe attachment, made by Henry Mfg. Co., is a hydraulic unit employing 12 to 22-inch buckets. It digs to a depth of 7 feet, swings 60 degrees to either side of center to dump material, and has a positive stop at center to assure straight-line digging. An optional hydraulically actuated bucket permits dumping material as high as 6 feet 2 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 209.

Ferguson Men in Canada

M. P. Paupst is now Service Manager in western Canada for Harry Ferguson, Inc., Detroit equipment manufacturer, and W. R. Tinkess is Product Education Manager for the same area.



A new wrinkle in highway signs—letters out of waterproofed plywood and screw-mounted on the sign background. Pennsylvania's Traffic Engineer Cartwright, District 1, evolved the letters and effected a maintenance saving of more than 300 per cent.

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GEORGIA—W. C. Cayo & Co., Inc., 787 Windsor St., S.W., Atlanta.

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IDaho—Intermountain Equipment Co., Broadway at Myrtle St., Boise; 210 N. Fourth, Pocatello.

INDIANA—Reid-Holcomb Co., 1615 Kentucky Ave., Indianapolis.

IOWA—James W. Bell Co., Inc., 1720 1 Ave., N.E., Cedar Rapids; 2818 Fifth Ave., Des Moines 13.

KANSAS—The Victor L. Phillips Co., Box 1557, Wichita.

KENTUCKY—Bogie Equipment Co., 801 E. Third St., Lexington 47; 1212 S. Seventh St., Louisville.

LOUISIANA—Frank P. Fischer Engineering Co., 7934 Maple St., New Orleans 18.

MAINE—Parker-Danner Co., Riverside Drive, Augusta.

MASSACHUSETTS—Parker-Danner Co., 25 Factory St., Hyde Park 30; 71 Needham St., Newton Highlands.

MICHIGAN—Edgy & Co., 1377 E. 8 Mile Rd., Detroit 2500 S. Pennsylvania Ave., Lansing 4; Spratts Engineering Co., 400-2 Ashmun St., Sault Ste. Marie.

MINNESOTA—Ruffridge-Johnson Eq. Co., 250 Teath Ave., S., Minneapolis.

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MISSOURI—The Victor L. Phillips Co., 16th and Baltimore Sts., Kansas City; The George F. Smith Co., 5215 Manchester Ave., St. Louis.

MONTANA—Hall-Perry Machinery Co., 304 Pratt Bldg., Billings; 802-812 E. Iron St., Butte; Ceram; P. O. Box 207, Great Falls; Missoula.

NEBRASKA—Anderson Equipment Co., 200 Merchants Nat'l Bank Bldg., Omaha 5.

NEW HAMPSHIRE—Parker-Danner Co., 507 Elm St., Manchester.

NEW JERSEY—R. E. Brooks Co., Route 17, Box 17, Haddonfield Heights.

NEW MEXICO—R. L. Harrison Co., Inc., 1801 N. Fourth St., Albuquerque.

NEW YORK—Syracuse Supply Co., 76 Wall St., Binghamton; 2080 Military Rd., Buffalo 17; R. E. Brooks Co., 50 Church St., New York; Syracuse Supply Co., Pearlville Rd., Olean; Van's Equipment Sales, Inc., Routes 9 and 20, Rensselaer; 1340 University Ave., Rochester; Syracuse Supply Co., 294 Ainsley Drive, Syracuse.

NORTH CAROLINA—North Carolina Equipment Co., P. O. Box 5086, Asheville; P. O. Box 1203, Charlotte; P. O. Box 128, Guilford; P. O. Box 655, Wilmington.

NORTH DAKOTA—Northwestern Equipment, Inc., 715 11th St., Bismarck; 301 Eighth St., Devils Lake; P. O. Box 110, Dickinson; P. O. Box 152, Fargo; P. O. Box 335, Minot; P. O. Box 626, Wahpeton.

NEVADA—Sierra Machinery Co., 307 Merrill Ave., Reno.

OHIO—The W. W. Williams Co., 914 Main St., Cincinnati; 16301 Brookport Rd., Cleveland 11; 835 W. Goodale Blvd., Columbus; 1260 Conant St., Maumee.

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OREGON—Howard-Cooper Corp., Highway 98E, P. O. Box 433, Albany; Highway 59, P. O. Box 95, Central Point; P. O. Box 1, Coquille; First and Van Buren, Eugene; 5621 N. E. Glisan St., Portland 13; 225 E. 2nd Ave., S., Roseburg.

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SOUTH CAROLINA—South Carolina Equipment Co., 444 Gadsden St., Columbia.

SOUTH DAKOTA—Sioux Road Equipment Co., 500 E. Sixth St., Sioux Falls; Box 941, Rapid City.

TENNESSEE—Wilson-Wesner-Wilkinson Co., 262 W. Mercia Ave., Knoxville; Tri-State Equipment Co., 124 E. Calhoun Ave., Memphis; Wilson-Wesner-Wilkinson Co., 310 S. 2nd St., Nashville.

TEXAS—Alamo Iron Works, Brownsville; Corpus Christi; Tri-State Equipment Co., 500 E. Overland St., El Paso; Conley-Lott-Nichols Machinery, 1311 E. S. Ervay St., Dallas 1; 3601 Avenue "H", Lubbock; Tri-State Equipment Co., P. O. Box 472, Odessa; Alamo Iron Works, Santa Clara & Montana Sts., San Antonio 6.

UTAH—Kimball Equipment Co., 222 W. 17th St., Salt Lake City 10.

VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 39th St. and Kilham Ave., Norfolk; Natural Asphalt Corp., of Virginia, 1901 Hamilton St., Richmond.

WASHINGTON—Glenn Carrington & Co., 91 Columbia St., Seattle 4; Howard-Cooper Corp., 5045 - 4th Ave. S., Seattle 5; Intermountain Equipment Co., 811 E. Sprague, Spokane.

WEST VIRGINIA—West Virginia Tractor & Eq. Co., P. O. Box 473, Charleston 3; P. O. Box 587, Clarkburg.

WISCONSIN—The Stone Manufacturing Co., 321 N. 25th St., Milwaukee 3; Badger Equipment Sales, Inc., Route 2, Thiensville.

WYOMING—Studer Tractor & Equipment Co., East Yellowstone Highway, Casper.

ALASKA—Glenn Carrington & Co., c/o Westward Hotel, Anchorage.

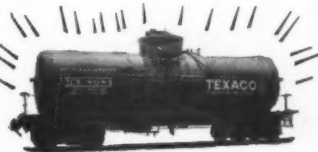
CANADA—Mussens Canada, Ltd., Church St., New Brunswick, Fredericton; Coleman Machinery Co., Ltd., 101 Upper Water St., Nova Scotia, Halifax; Mussens Canada, Ltd., 65 Colborne St., Montreal 3; Toronto Equipment & Supply, Ltd., 111 Merton St., Toronto; Ontario; Frost Machinery Co., Ltd., 871 Erie St., Winnipeg, Manitoba; International Agricultural Machinery Co., 2315 Cambie St., Vancouver, B. C.; Mussens Canada, Ltd., Charest Bldg., Quebec.

HEAT TANK-CARS FASTER

uses less fuel..water..work

Do it the modern way

with a Cleaver-Brooks MOBILE TANK-CAR HEATER

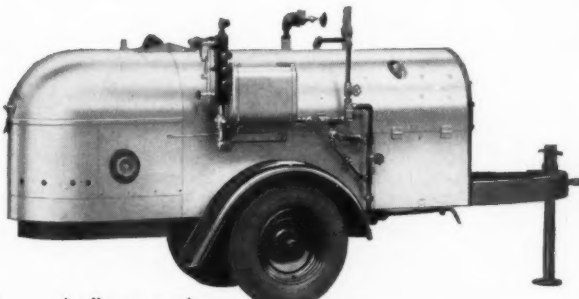


Quick Job-to-Job Transport

This trim, compact, highly efficient, trailer or truck mounted steam generator is easily towed by car or truck — anywhere you need steam — for heating, thawing, cleaning — at tank-car siding, construction site, or material yard.

Hot Dry Steam in 20 minutes or less

Designed for fast steaming, the Cleaver-Brooks Tank-Car Heater gives you 125 lbs. of steam pressure in 20 minutes or less — from a cold start. It's the only tank-car heater with the fuel-saving four-pass flue travel construction. No water problem — full condensate recovery and return to heater under pressure.



An all purpose unit — provides steam wherever needed — for heating, thawing, cleaning.

Built for Full Capacity ... Full-Time Work

Not just a "boiler on wheels" but a sturdy, compact, steam generator built by specialists in steam generating equipment — the pioneers and originators of tank-car heaters and bituminous boosters. Design and construction provides maximum steaming capacity with lightest weight for easy portability. Available in three sizes, trailer or skid mounted — 1 car heater (17 bhp) — 2 car heater (28 bhp) — 3 car heater (42 bhp). Write for the catalog.

CLEAVER-BROOKS COMPANY
390 E. Keele Ave., Milwaukee 12, Wis.

BUILT WITH THE FAMED
FOUR-PASS HIGH EFFICIENCY DESIGN OF

Cleaver-Brooks

STEAM BOILERS



Get the complete facts on the only tank-car heaters built with the fuel saving four-pass flue travel construction — send for the Cleaver-Brooks Tank-Car Heater Catalog.



Large Reservoir Job Boosts Water Supply

50-Million-Gallon Storage Created as Contractor Digs Hole In Ground and Lines It With Concrete

• WHEN Pasadena's water storage supply became inadequate, officials of that southern California city solved the problem by calling for construction of a new 50,000,000-gallon storage reservoir, on the eastern edge of the city. The \$1,049,000 contract for excavation, concrete lining and roof, and construction of a pumphouse was let to E. C. Nickel of nearby Arcadia. After a 2-year construction period, officials of Pasadena's Water Department hope to have the project in service by the end of this year.

Known as Hastings Reservoir, the project is situated on a 15-acre parcel of land north of Sierra Madre Boulevard. The new reservoir, which will increase Pasadena's storage potential from 65,000,000 to 115,000,000 gallons, will have the same overflow elevation as Sunset Reservoir, in the western part of the city. A 36-inch pipeline has already been laid to connect the two installations. The newly developed water potential, with existing reservoirs, will furnish storage for approximately 3 days' supply.

Reservoir Is Large

The new reservoir is a rectangular affair 475.5 feet wide and 575.5 feet long. Its sides are sloping, while the bottom and roof are flat. Watertightness has been achieved by using continuous runs of rubber water stop, with all of the tees and crosses vulcanized in the field. The rubber water stop is inserted during the various pours to close every concrete construction joint. Tapered wood strips form a shallow keyway so the joints can also receive an application of mastic sealer.

To support the massive 9½-inch roof, designers used 643 reinforced-concrete columns 20 inches square. The bottom and sides, also of reinforced concrete, are 6 inches thick. The reservoir roof is to be backfilled with about 2 feet of earth, and covered by a planted area. With the exception of the vent and inlet structure, only a small air vent will protrude above ground. Three electrically powered pumping units, each driven by 250-hp motors, will lift water to the area of the city higher than Hastings Reservoir. Chlorinator equipment and a small testing lab complete the picture.

Excavation: A Tractor Job

Approximately 250,000 cubic yards of excavation had to be moved to shape the reservoir. Part of this yardage was simply removed and wasted in a nearby arroyo, but much of the yardage had to be incorporated along the south side to form support for that part of the structure. Moreover, reasonably high compaction standards were established to coincide with California Division of Highways requirements for similar support. Heavy dirt work and compaction was sublet to Fred McKinley of Clearwater, Calif.

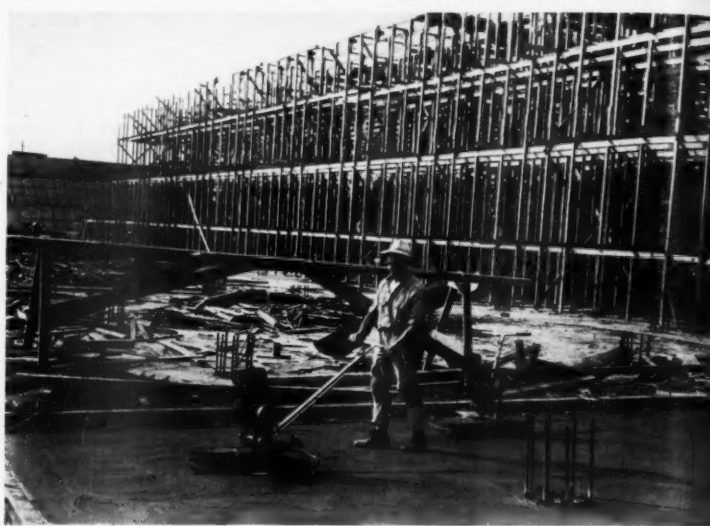
McKinley started his excavation by bringing in three LeTourneau Carryalls and enough D8 Caterpillars to pull the machines and assist in pushing. The topsoil was stockpiled so it could be used again to cover the reservoir roof, and aid the growth of the planted area.

When local stockpiling and the construction of the south embankment had proceeded about as far as it could, the earth hauls became somewhat longer. It was then necessary to spoil the waste dirt in an arroyo about 1,000 feet away.

McKinley brought in three Tournapulls to do that part of the work. Access ramps, left in place until the very last, let the machines get down to grade. Fortunately, neither hard rock nor ground water was found. The material was mostly sand and gravel, with some clay and a few small boulders present.

Once the reservoir hole was constructed, the remainder of the work had to proceed as swiftly as possible. Hastings Reservoir is situated not far from the Sierra Madre mountain foothills,

(Concluded on next page)



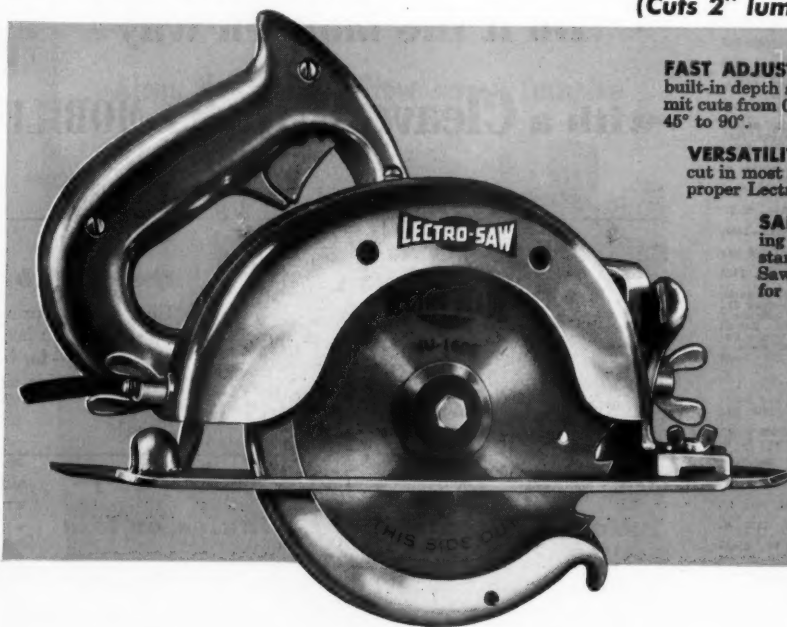
C. & E. M. Photo

A Master power finisher trowels off one of the reservoir floor slabs. Timber uprights to support the roof slab are in position

NEW!

6" Heavy-Duty Deluxe LECTRO-SAW

(Cuts 2" lumber)



FAST ADJUSTMENT! Quick-changing, built-in depth and bevel adjustments permit cuts from 0" to 2" depth; bevels from 45° to 90°.

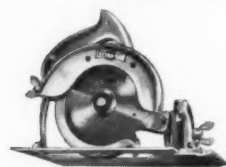
VERSATILITY! Makes most every cut in most all building materials with proper Lectro-Blade or Abrasive Disc.

SAFETY! Foolproof telescoping lower blade guard. Instant-release trigger switch. Saw-grip handle positioned for easiest control.

POWER! Power-packed universal motor specially designed and built by Black & Decker for continuous, trouble-free power sawing.



BEVEL ADJUSTING QUADRANT calibrated for easy reading, fast adjustment in bevels from 45°-90°.



TWO DEPTH ADJUSTMENTS (front and rear) permit handle to be kept at comfortable wrist position, even in very shallow cuts.



PRACTICAL SAW PROTRACTOR! Sets in a jiffy to make rapid, extremely accurate cuts with any power saw. Sets at any angle. Use with Saw's bevel adjustment for compound mitering. Only \$4.50.

What Speed . . . What Savings What a Buy for only \$76.50

Here's a sure-fire way to put extra dollars in your pocket, cut extra hours off your building jobs! Get yourself a great, new 6" Heavy-Duty Deluxe LECTRO-SAW! It beats hand sawing 10 to 1! Weighs only 11¼ lbs., close-coupled, perfectly balanced for easy one-hand control. And it's a really durable heavy-duty Saw, gives you job-proved features that mean extra-long service—dependable Black & Decker-built universal motor, full-size ball bearings, high-quality helical gearing, hardened armature shaft, husky housings, etc. Try one, buy one at your building supply dealer's. It will pay for itself almost before you can say 6" Heavy-Duty Deluxe LECTRO-SAW!

Professional Saws at Popular Prices!

Also: 6" Heavy-Duty model (\$56.50) 8" Heavy-Duty model (\$92.50)



Products of HOME-UTILITY Div., BLACK & DECKER Mfg. Co.
Dept. H-787, Towson 4, Maryland

and the threat of flooding from heavy winter rains was constant.

Concrete Work

Concrete construction followed a regular schedule. The bottom was placed first, then the sides, and finally the top.

The bottom slab was divided into a number of pours 40 feet square. The pouring sequence was set up so that there would be room at all times for truck mixers to reach the various locations—part of the time over the ground; part of the time over finished concrete. As the truck mixers from a nearby commercial ready-mixed-concrete plant came in to the pours, they discharged the fresh concrete directly, through chutes. Small Viber electric vibrators helped to puddle this concrete, after which it was hand-screeded. Two Master power trowels put on most of the dense finish, and a small amount of hand finishing was done to smooth up the remainder.

Lining on the reservoir slopes presented still another problem. It was slower work, because the $1\frac{1}{2}$ to 1 slopes were steep and access was never quite as good as it was in the bottom. For this work, the concrete was chuted through multiple chutes and puddled by small vibrators. Wood floats, operated by hand, finished this concrete.

Some of the most difficult concrete of all was in the flat roof, because expensive forming, column pouring, and support work was necessary. It was necessary to form many of the columns at one time, for example, to make good speed with pouring, because city specifications limited the rate of filling to 5 feet an hour. The columns were formed with wood panels, and clamped together from the outside by special job-rigged clamps which permitted faster work on the high forms.

Shoring under the roof slab consisted of 4 x 4 uprights on approximate 4-foot centers. Double rows of 1 x 6 X-bracing, and emergency sway bracing made them rigid. Despite these bracing precautions, however, a severe windstorm shortly after the first of the year blew down a large panel of uprights. It cost about \$6,000 to replace.

On top of the upright shores, 4 x 6 caps carry the decking for the roof. Decking is 2 x 12 oiled lumber, cut to size in a central carpenter yard.

When CONTRACTORS AND ENGINEERS MONTHLY visited the project, roof pouring had not begun, but plans for that activity had been completed. The contractor contemplated the use of a Rex 200 Double Pumpcrete machine, with an 8-inch delivery line. The Pumpcrete machine would work the entire deck from one location. An alternate method, which was to be held in readiness in case the Pumpcrete method proved impracticable, was the use of Gar-Bro Power Carts. Four of these machines were held in readiness; in fact, these machines performed minor hauling on a few of the more inaccessible floor slabs.

Exposed concrete was cured by Hunt Process Clear curing solution. Concrete exposed to earth backfill was treated with two coats of liquid asphalt paint, and a coat of whitewash.

Exceedingly high construction standards were maintained throughout the project, and officials hope its completion will solve Pasadena's water problem for a long time to come. Water for the new reservoir will be supplied by Metropolitan Water District, originating at Parker Dam on the Colorado River.

Personnel

The project was designed by Consulting Engineer James Montgomery of Pasadena, under the general supervision of Morris S. Jones, Chief Engineer and General Manager of Pasadena's Water Department. Duncan A. Blackburn is Jones' assistant, and W. E. Barney was Resident Engineer.

On the contractor's side of the fence,

operations were supervised personally by E. C. Nickel, with Harry Thorne in charge as General Superintendent. Don Overholser was Labor Foreman. Field fabrication of rubber water-stop connections was the responsibility of C. E. Boswell, who with Goodyear engineers worked to make field fabrication fast and practical.

Contractor-Tool Catalog

Many contractor tools are illustrated and described in the new 8-page catalog offered by Arrow Tools, Inc., 1900 S. Kastner Ave., Chicago 23, Ill. The Structo line of tools includes moil points, chisels, drift pins, sledges, hammers, wrenches, tongs, pneumatic rivet sets, and air-hammer tools. Available sizes, weights, and prices are included in the description.

This literature describing Arrow tools may be obtained from the company by requesting Bulletin CT 750, or by using Request Card at page 16. Circle No. 111.



C. & E. M. Photo

Forms for \$1,049,000 Hastings Reservoir project, Pasadena, Calif., were prefabricated in this central yard. The saw in the foreground is a Comet.

Project Rated

BY THE USER'S CHOICE

OF

- ✓ CRAWLER LENGTHS
- ✓ LOWER FRAME WIDTHS
- ✓ SHOE WIDTHS
- ✓ BUCKET SIZES
- ✓ COUNTERWEIGHTS

EXCAVATORS

INSLEY

CONCRETE EQUIPMENT

INSLEY MFG. CORP.
INDIANAPOLIS 6, INDIANA

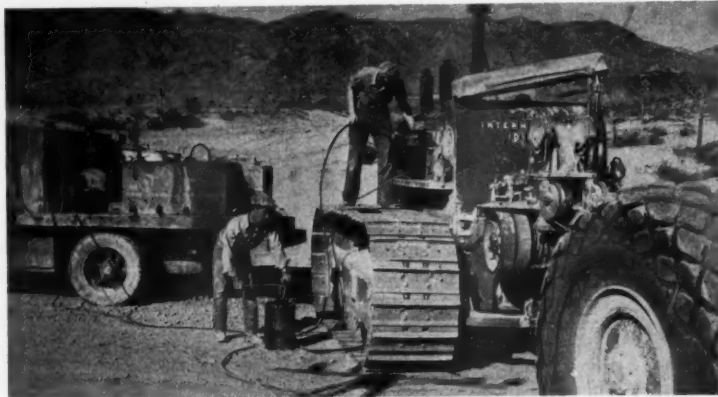
Tonic for Tractors

Peps Up Performance

A tonic for tractors has been devised by Fred O. Schreck, Supervisor of Service for the Industrial Power Division of International Harvester Co. Start with the engine, he says, and change old, dirty, and diluted winter oil to a recommended summer grade. Remember to have the engine hot when you drain the old oil.

Then drain the cooling system to get rid of the antifreeze, and fill it with a solution of from 5 to 10 pounds of ordinary washing soda and water. Operate the engine, with the radiator fill cap off, until the water is hot, then drain and flush with clean water. Refill with soft water, rain water if possible, and add the recommended amount of rust inhibitor.

Water-hose clamps should be checked for leakage and tightened if necessary. To check for leakage remove the fan belt so the water pump will be inoperative. Fill the radiator to the top, leave



An International TD-24 is given a preventive-maintenance tonic in the field. The man at left checks the track assembly while the man on top checks the lubricant in the final-drive housing. A service truck stands by.

the cap off, and, while the engine is running, hit the throttle hard and watch for air bubbles. If bubbles appear, it's a good indication of leakage around the cylinder-head gaskets.

Don't forget to check and adjust fan-belt tension. Inspect the fan for bent and loose blades and check the cap-screws of the fan hub mounting for tightness. Clean the spaces between

the radiator fins by blowing them out with an air hose or flushing with a water hose. Clogged fins can cause overheating and a cracked block.

While you're about it, clean and refill the air-cleaner tray with equal parts of oil and kerosene. This mixture permits a better flow of air to the manifold and does not reduce the cleaning efficiency of the unit. Tighten air-cleaner connections and examine the pipe from cleaner to manifold for holes or cracks. Abrasives entering the engine from improperly filtered air can cause serious damage to rings and sleeves.

If your tractor has a gasoline starter system, check the gasoline strainer and clean and wash the bowl. Distributor and magneto points should be inspected for wear and correct gap setting.

Look at the diesel-fuel water trap. It may be time to take it apart and clean it. Replace oil-filter elements.

Now to the battery—clean the terminals with hot water and baking soda, or steel wool if necessary, and coat them with vaseline. Be sure the cells are filled with distilled water to $\frac{1}{4}$ inch above the separators. If the battery water level is consistently low, it may be a sign that it is being overcharged. Adjust the charging rate at once where necessary, to prevent serious damage to the battery.

To insure fast starting, lubricate the magneto impulse coupling with kerosene or light machine oil.

If the transmission and final-drive lubricants have not been changed for a season, now is the time to do it. Work the tractor until the lubricant is warm and then drain. Refill with the grade recommended by the manufacturer.

Inspect the track assembly and adjust the track to the soil in which the tractor is operating.

These preventive-maintenance suggestions are not expensive or time-consuming and they can be followed in the field. If they are postponed or overlooked, real trouble may develop later on.

Cleveland Vibrator Expands

The Cleveland Vibrator Co., Cleveland, Ohio, has added a building of concrete block and steel construction to its plant. It will house automatic screw machines used for vibrator production.

NEW IMPROVED! CANCAP automatically protects tractor exhaust systems from damaging rain, sleet and snow...

New Wider Opening Action Allows Unrestricted Exhaust Gas Escape.

Lightweight Cast Aluminum Cap Opens with First Puff Of Exhaust.

New, Long Wearing Malleable Iron Hinge Insert Built Right Into Lightweight Cast Aluminum Cap.

Cadmium Plated Locking Screw With Shakeproof Washer Insures Longer Life.

PROMPT DELIVERY At Dealers Or Order Direct From

CANTON CAST PRODUCTS CO. 2400-13th St. N.W. Canton, Ohio

makers of the CANTON TENSION PULL LOAD BINDER

3 SIZES FIT ALL EXHAUST PIPES FROM 1 3/4" to 4 1/2"

NO. 2 CANCAP — fits all exhaust pipes from 1 3/4" to 2 3/4" — \$2.25 ea.

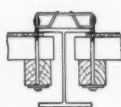
NO. 3 CANCAP — fits all exhaust pipes from 2 3/4" to 3 1/2" — \$2.25 ea.

NO. 4 CANCAP — fits all exhaust pipes from 3 1/2" to 4 1/2" — \$2.75 ea.

SUPERIOR ACCESSORIES ON THE BEAM

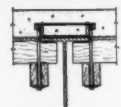
Designed to meet field conditions on BRIDGE SUPER-STRUCTURES, these three types of Hangers provide efficient means for hanging forms from steel beams and girders, not fireproofed.

STANDARD COIL HANGER FRAME



When hanging forms where specifications do not permit any hanger wire to be exposed after stripping, use Superior Standard Hanger Frames. Detail at left shows their use with double ledgers, $\frac{1}{2}$ " coil bolts, and flat washers. Total safe load on both bolts is 4,500 lbs., or 2,250 lbs. per bolt.

SPECIAL COIL HANGER FRAME



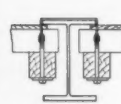
AT LOW HAUNCH



AT HIGH HAUNCH

The design of certain bridge superstructures allows for the permanent deflection of the beams or girders due to the pre-calculated dead load. This deflection is compensated by a concrete haunch on the upper flange, which varies in depth. Superior Special Coil Hanger Frames were developed to efficiently meet this field condition, at the same time avoiding any exposed hanger wire. The extent to which the $\frac{1}{2}$ " Coil Bolts are threaded into the coils allows for these varying haunch depths from maximum to zero. (See detail at left.) Total safe load per frame is 10,000 lbs., or 5,000 lbs. per $\frac{1}{2}$ " bolt.

COIL BEAM SADDLE



Superior Coil Beam Saddles are used, as shown at left, where hanger wires may be cut after stripping the forms. The Coil Bolts allow for any variation in lumber and flange thickness and tightening the bolts pulls the forms tightly against the flanges. Forms are easily stripped. Safe load is 6,000 lbs. per saddle, or 3,000 lbs. for each $\frac{1}{2}$ " Coil Bolt. Coil Beam Saddles are also furnished for $\frac{3}{4}$ " and 1" bolts.

NOTE: WORKING PARTS (Bolts and Washers) are returnable. Layouts and estimates for Superior Hangers are available without cost or obligation.

SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office: 1773 Broadway, New York 19, N.Y.
Pacific Coast Plant: 2100 Williams St., San Leandro, Calif.



Request a copy of our NEW CATALOG 500



Compressed-air cleaning is the main piece of news about Joy's new Champion blast-hole drills. This is the Heavyweight model which drills holes up to 7 3/4 inches.

New Blast-Hole Drill Has Special Features

A new rotary blast-hole drill with compressed-air cleaning, first of its kind, has been designed by Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa., for all types of high-production excavation. It drills with a continuous pressure-cutting rotary motion, using a tri-cone roller bit as its cutting medium. A blast of compressed air removes the cuttings from the face of the bit, permitting dry drilling. This rotary air-blast drilling method has resulted in increased drilling speeds and bit life, according to Joy.

Bits used with the Champion have three bearing-mounted cones on which the teeth are arranged in definite patterns. These patterns differ on bits to be used for rocks of different hardness. Compressed air is introduced through the drill pipe, and at the bit is directed to the periphery of the hole to remove cuttings. The large volume of air flowing over the bit also keeps it cool while drilling. The cuttings are blown to the surface outside the drill pipe and collected there by a rotary-type dust collector.

The drill feed is hydraulic with speed regulated by controlled pressure. The pipe is re-chucked automatically at the end of each 4-foot advance of the bit. A single control lever releases the chuck at the bottom of the feed travel. After being raised automatically to the top of its stroke, the chuck automatically grips the square drill pipe by a simple movement of the control lever.

Two models of the Champion are available, the Heavyweight which will drill a hole up to 7 3/4 inches, and the Middleweight which will drill a 6 1/4-inch hole. Both may be electric or diesel-powered.

The Champion is mounted on crawler treads and is self-propelled. The Heavyweight trams at speeds from 1 to 5 mph; the Middleweight, from 1 to 7 mph. Three hydraulic jacks, each with a 49-inch stroke, level the machine when in drilling position. An integral derrick, raised and lowered hydraulically, speeds setup and dismantling time. The standard derrick will

handle 20-foot lengths of drill pipe, and a special 40-foot derrick is available to handle 30-foot lengths. The weight of the Heavyweight is 46,000 to 50,000 pounds depending on the drive.

The manufacturer reports the following field-test results: 20 feet per hour in hard dense dolomite; an average of 50 feet per hour with a Heavyweight and 38 feet per hour with a Middleweight drilling in a Michigan limestone quarry; and 44 feet per hour drilling through silt, muck, clay, shale, and sandstone in a southern Indiana strip mine.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 122.

Y&T Sells Scale Business

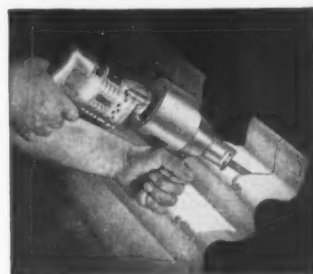
The Philadelphia Division of the Yale & Towne Mfg. Co. has sold its industrial-scale business to Deteco Scales, Inc., Brooklyn, N. Y. The transaction involves scale patents, equipment, parts inventory, and the trade name Kron.

Power Saw and File In One Portable Unit

A new portable power saw and file has been introduced by E-Z Way Tool Co., 549 W. Washington St., Chicago 6, Ill. It attaches directly to electric or air drills, or flexible-shaft machines, for power; the saw mechanism converts the rotary action of the power unit to a reciprocating motion.

By inserting a standard hack-saw blade in the holder, a fast power saw is provided that is said to cut through all metals including stainless steel, Monel, and difficult corrugated stock—also wood, plastics, composition, and other materials. By inserting a machine file in place of the cutting blade, you have a power file.

The unit operates with a rapid 7/8-inch stroke and is said to be practically vibration-free. Special blades are available for extremely heavy cutting operations. The saw tooth arrangement is designed to eliminate gummed teeth when sawing plastics and sim-



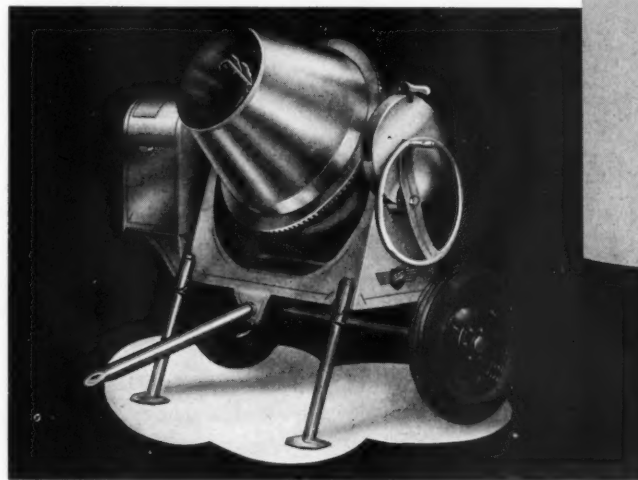
The E-Z saw attaches directly to electric or air drills, or flexible-shaft machines, for power. It also converts to a power file.

ilar materials. For maneuvering in close quarters, the saw has an adjustable handle which can be turned and locked in any desired position. A full-length cutting blade can be inserted to reach into those hard-to-get-at places.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 163.

You're losing money if you're not using an Essick Concrete Mixer!

Conventional 3 1/2-S half-sack mixers make only a barrow and a half per batch, but an Essick "Big Boy" mixes two full barrows of concrete each time! Contractors everywhere who now use the "Big Boy" praise its two-barrow batch capacity and find that this unit actually makes up to 50% more concrete per day than half-sack units.



Check these "Big Boy" advantages:

2 full barrows per batch—guaranteed unbreakable steel bowl.

All-steel electrically welded construction.

Heavy duty, air cooled engine with enclosed reduction gears rotating in oil—no counter shaft!

Low center of gravity—easy to move, easy to trail.

Designed and engineered for convenient, fast operation.

no!



Delivering partially-full wheelbarrow loads costs as much labor time as pushing full loads. Cut your expenses with an Essick "Big Boy" Mixer—it gives you two full loads per batch! Remember, conventional 3 1/2-S half-sack mixers make only a barrow and a half per batch.

yes!



Essick "Big Boy" Model 62C End Discharge Concrete Mixer. Also available in Model 62B Side Discharge. Both Models mix two full-barrow loads per batch. Other Essick Models make a one-barrow batch (Model 350) and a three-barrow batch (Model 93—the "ONE SACKER").

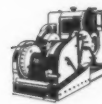
YOU CAN DEPEND ON ESSICK EQUIPMENT
—PROVED IN USE FOR 28 YEARS!



MIXERS



PUMPS



HOISTS



ROLLERS

Mail coupon today for more information about Essick Concrete Mixers that will save you job time and labor costs.

ESSICK

Essick Manufacturing Co.
Los Angeles 21, California
Sales & Service—Coast to Coast

TO: ESSICK MANUFACTURING COMPANY, DEPT. CEM-6
1950 Santa Fe Avenue, Los Angeles 21, Calif.

Please send me more details about your Concrete Mixers.

I am interested in a machine that mixes a _____ one barrow batch,
_____ two barrow batch,
_____ three barrow batch.

I am also interested in other Essick equipment: _____ (PLEASE NAME)

NAME _____

COMPANY _____ TITLE _____

ADDRESS _____

CITY _____ STATE _____

Greyco

Model 60

ELECTRIC DRILL

- Written lifetime guarantee • Easy to handle
- Powerful • All ball and needle bearing
- Compact • 3-Jaw geared Jacobs chuck
- Lightweight • Patented Jacobs key holder

Write: Greyhound Arc Welder Corp.
604 Johnson Ave., Brooklyn 6, N. Y.

Air Photos Pay Off In Highway Planning

Mississippi Finds Aerial Photogrammetry a Modern Method That Saves Time and Money in Highway Planning

By I. W. BROWN,
State Manager, Traffic and Planning
Division, Mississippi State Highway
Department

• IT was about nineteen years ago that highway engineers in Mississippi had their first experience with vertical aerial pictures as an aid in highway survey work. This was on an 18-mile new-location job in a swampy delta area. The board of supervisors for the county in which this location was to be made had previously contracted for full county-coverage aerial photographs to be used in connection with land tax assessments. They willingly loaned the pictures for the location of this road through the county.

The contact prints were laid out shingle fashion in their relative positions by matching details. A temporary check or information line was located and drawn on each print along the line. The prints containing the line were carried to the field, and the proposed location was field-checked at more or less regular intervals of $\frac{1}{4}$ to $\frac{1}{2}$ mile. Correction or line-alteration notes were made on the prints and they were re-assembled, the line revised, distances scaled, and the central angles measured for the field hub center-line location.

This one location, conservatively estimated, saved from \$2,000 to \$2,500. This does not include possible savings on earthwork quantities nor benefits of superior location.

First Air-Photo Contract

Our first contract for aerial photographs was let in February, 1935. This was an experimental venture covering seven different locations varying from rugged mountainous sections to flat delta lands, and from sparsely settled plains to built-up urban areas. This contract covered a combined section of some 125 miles or more in length and 250 square miles of area of strip photography. It called for one set of stereoscopic contacts, scale 1 inch equals 1,000 feet; one index map of each location; one mosaic of each location, scale 1 inch equals 400 feet; one set of enlargements, scale 1 inch equals 400 feet; and loan of necessary optical apparatus for relief interpretations for one year.

The total cost of this contract was \$2,487.50. It varied from \$15 to \$45 per square mile, depending on the area. Using these photographs, locations on each of the seven different sections were made and highways built.

Comparative Cost of Location

We have a very definite and interesting cost comparison on one of the sections included in the contract: the actual cost of a field location survey without the use of aerial pictures, and the cost of a field location through the same section of country with air photos. We also have a definite figure on the savings in grading.

These examples are interesting since there was no forethought as to a possible comparison to be made either then or later. What happened is this: a relocation on a 22-mile section of U. S. 61 was made in 1933. The field survey was completed and the plan quantities worked up ready for letting. But finances for road building were then at a low ebb and the contract was temporarily delayed. At that time the grading estimate was considered ex-

tremely heavy, although the location was through a rugged section of the state, and for this reason the survey location was accepted as possibly the best to be had through that area.

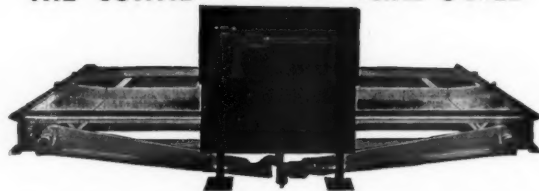
This same section was later included in the experimental aerial contract let in 1935. After making a careful stereoscopic study of the aerial photographs on this section, it was decided that the original or first location could be improved sufficiently to justify another field location. This resulted in a completely new location in 1936. The plans

on this new line were worked up, quantities computed, the contract let, and the road built.

The survey without aerial photo-

graphs was made between June 26 and December 6, 1933. The length of line was 12.35 miles; the cost of the survey (Concluded on next page)

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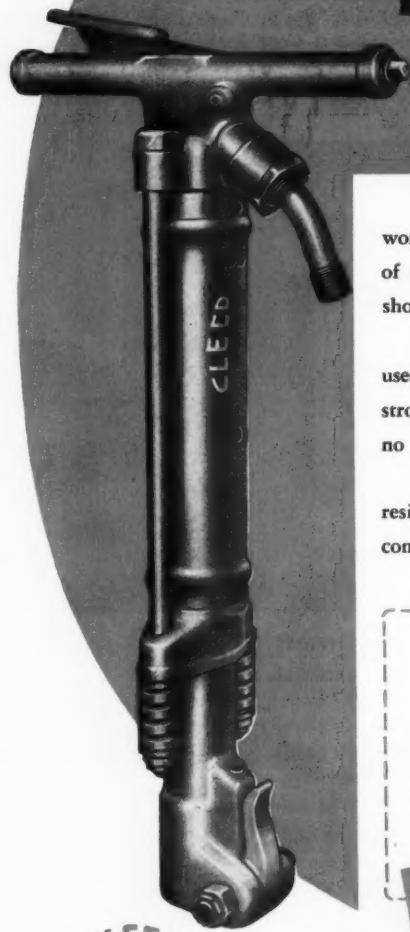
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was \$3,645.00; the cost per mile was \$295.14. This seems high for field location surveys, but the country is very rough and sparsely developed, and two different lines were made and completed for further study.

The survey with aerial photographs was made between January 11 and March 2, 1936. The length of line was 14.19 miles; the cost of the survey was \$1,339.86; the cost of photos was \$675.00; total cost was \$2,014.86; cost per mile was \$141.99.

Another consideration that could be taken into account is the difference in the salary scale at the time the two surveys were made. The wage scale was up 26.1 per cent in the intervening time.

The difference in the length of the locations is due to the different points of beginning. The final location as built is 0.56 mile or 4.1 per cent longer than the theoretical tangent line connecting the extreme ends of the project. This is considered a very good location as far as the general direction is concerned, especially in rough country. We in Mississippi try to hold our location in rough country to a maximum of 10 per cent added distance to the theoretical straight line connecting two control points.

Comparative Construction Cost

On this same project, excavation quantities were worked up for both locations. Without aerial photographs the excavation was 529,466 cubic yards, or an average of 42,872 cubic yards per mile. With the aid of aerial photos the total was 390,736 cubic yards, or an average of 27,536 cubic yards per mile. The saving in quantities on the location made with the aid of aerial photographs was 15,336 cubic yards per mile. Since excavation on this project was contracted at 23 cents per yard, there was a saving of \$3,527.28 per mile or a total saving of \$50,052.12—35.8 per cent on the excavation quantities alone. The saving on the survey and the excavation together was \$3,680.43 per mile or a total of \$52,225.30 for the entire project.

I would not say this would be representative in comparing all highway locations in Mississippi, or all highway location surveys in other states, since this was through an unusually rugged section of the country. I do believe it is representative of what may be expected in similar areas.

Low-Cost Drainage Surveys

We have an equally interesting cost comparison on two methods of determining the watershed drainage areas for structure openings on cross drains: one with stereoscopic-coverage contact prints, and the other the conventional method of running out the dividing ridges in the field.

The problem involved the construction of a drainage structure across a stream known as Cow Creek. A few years ago a field survey party made a dividing-ridge survey for this watershed area. It lies in a mountainous, sparsely settled, wooded section of the country. The cost of the actual field work in running the traverse, plus the office time required for plotting and computing the area, was \$217.30.

In order to make a comparative esti-

mate with the aerial photos, one of our men pulled the contacts, set them up, ran the ridges, and computed the area in 3¾ hours. The cost, including the prints, was \$13.12. This is 6 per cent of the cost of the field survey by the conventional method.

As a result of this check, we made a number of similar comparisons where definite field information was available and found that the cost of determining watershed drainage areas with air photos ranged from 4.3 to 18.5 per cent of the cost by the field survey method. It seems reasonable to believe the drainages can be determined with a stereoscope and photographs for less than 15 per cent of the cost by the field survey method.

In the flat delta area the relief is not so pronounced and the dividing ridges are practically impossible to follow on aerial photographs with a stereoscope. The photographs can be used to equal advantage, however, by taking them into the field and plotting the divides on the prints as the divides are walked

out. One man can cover from three to five times the distance of a field survey party. After the dividing ridge has been located on the prints, it is a matter of returning them to the office; fastening them down on a large flat-top table in their relative position, shingle fashion, by matching like images; and tracing the ridge on a sheet of tracing paper. The area can then be determined by one of several methods: (1) planimeter; (2) dividing into rectangular areas suitable for computing; (3) placing the tracing over a sheet of cross-section paper and counting the squares inside the area.

Present Use of Air Photos

Aerial photographs are rather extensively used by our highway department engineers in both field and office work. Our central office in Jackson has stereoscopic contact prints covering the entire state. Each of the six construction district offices has complete stereoscopic contacts of each county in that district. The prints are of primary importance in

making general highway county maps, detail drainage-network sectional maps, field highway center-line location surveys, drainage-area surveys, section-line and property-line ties, bridge-location studies, municipal surveys, property estimates for right-of-way purposes, contours for special sections, and mosaics for special studies.

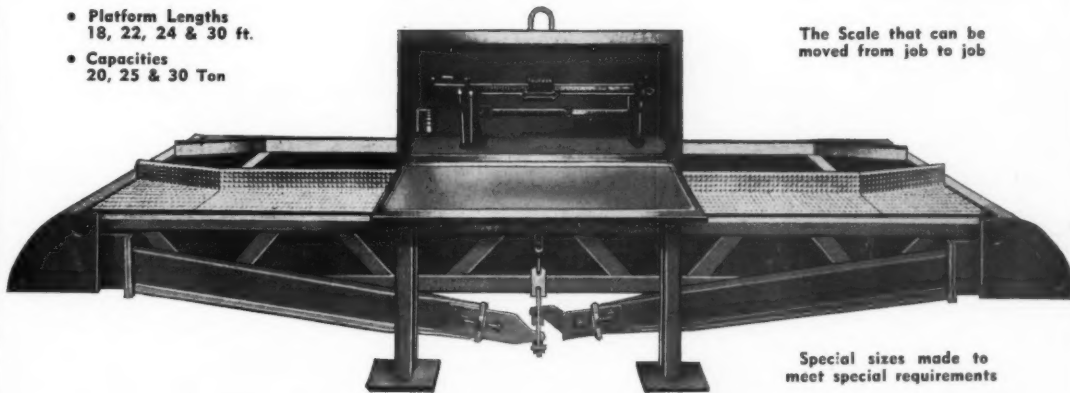
The major problem now confronting us is the need for trained personnel. We plan a rather strenuous four-week short course in aerial-photo study, set up to handle about 20 men. Our six district engineers were requested to send two men each. A similar school may be held each year, or as often as it appears necessary to keep a sufficient number of trained personnel.

From a paper presented at the 17th Annual Meeting of the American Society of Photogrammetry, January 10-12, Washington, D. C. The paper in full appears in the March, 1951, issue of *Photogrammetric Engineering*.

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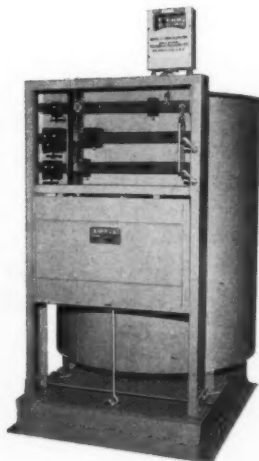
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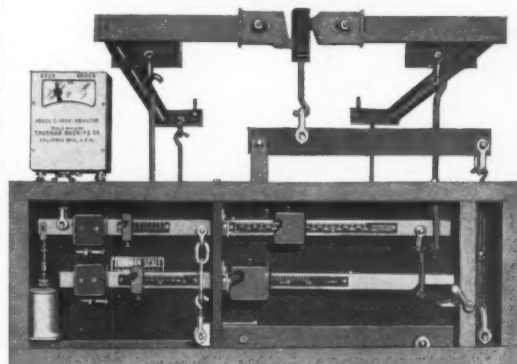


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Asphalt Lining Will Check Canal Seepage

USBR Contractors Install Buried Asphaltic-Membrane Lining On Riverton Project Canal to Cut Water Losses

By RAYMOND P. DAY,
Western Editor
(Photo on page 1)

• EXCESSIVE water seepage from unlined canals on the Riverton Project in central Wyoming will be controlled, it is hoped, thanks to buried asphaltic-membrane lining. The tough, leathery, watertight asphalt diaphragm is not part of a new technique, but it represents an important advance in the low-cost control of water seepage from irrigation canals.

Studer Construction Co. of Billings, Mont., has placed the asphalt lining on about 13 miles of the Wyoming Canal and Laterals W44.13 and W44.69, about 15 miles northwest of Riverton. Studer has also done asphalt work under a subcontract with Lichty Construction Co. and Brasel & Whitehead, Riverton contractors who had another section of the lining. Studer's prime contract with the U. S. Bureau of Reclamation was for \$104,000.

The Riverton Project has been under construction for several years. Two years ago Morrison-Knudsen Co., Inc., finished a string of irrigation canals Y-ing down on both sides of a high escarpment overlooking the north and south sides of the basin. Initial irrigation after the canals were placed in use indicated that serious losses through

seepage might complicate the agricultural and drainage situation in the valley below, unless losses were controlled. The Bureau of Reclamation last year placed a buried asphaltic lining on a canal near Torrington, Wyo., as well as a 4-mile section at Riverton, and it appeared so successful that the same treatment was specified for this canal.

Only the pervious parts of the canal got the asphalt. Sections where the ground was relatively impervious were passed over. The 13-mile job actually covered about 20 miles of canal because of this condition.

Contractors Work Together

By working together and pooling their equipment, the two contract holders speeded the work. That was very important, because the time limit was short. Asphalt membrane has to go in between the spring thaw and the time irrigation water is first required. On this particular project, the work had to be finished by May 1 after a March 20 start.

On the \$115,000 Lichty-Brasel-Whitehead contracts, the prime contractor performed all dirt work while Studer did the asphalt lining. On Studer's contract, Lichty - Brasel - Whitehead rented some dragline equipment to Studer, and also took care of dragging and rolling of earth.

Here's How It's Done

Asphalt construction followed certain well defined steps, which were improved upon to a point where the work was strung out over a distance of about 3 miles in this order:

Excavation: Since the asphalt membrane was to be buried about 12 to 18 inches beneath the surface, that much material had to be removed from the canal bottom and slopes. L. B. & W. has had excellent luck excavating the bottom of the canal with two Model C LeTourneau Roadsters. These two machines built their own ramps about every thousand feet, and quickly removed the bottom material. It was stored or stockpiled on the top of the canal berm near the service road.

Two draglines, working on each side of the canal, then removed the slope block. A Lorain and a Northwest 34-yard machine did this work for Studer. L. B. & W. excavated with two Bucyrus-Erie 22-B's. The operators were skilled, and when they finished the excavation, the canal banks were fairly smooth. The excavated material was cast on the stockpile for later use.

Dragging: In order to smooth the canal banks and bottom even more than the dragline operators were able to, USBR spex called for some type of mechanical dragging. On this contract, a TD-18 International tractor dragged with an old set of cat tracks from a large tractor. The tracks did an excellent job of smoothing each slope at a time, and finally the bottom was dragged smooth. To a limited extent an Austin-Western 99-M motor grader was also used on the bottom.

Rolling: The canal was then rolled, so the disturbed material would be smoothed and recompact. Two special rollers were made in Lichty's machine shop for this purpose. They consisted of dual 36-inch steel-wheel drums, mounted in a frame similar to a sheepfoot roller so they would oscillate freely. The rollers had a drag

(Continued on next page)



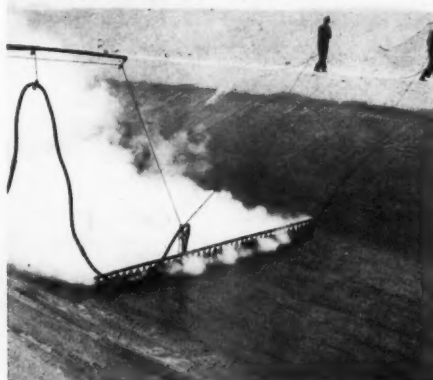
A Lorain and a Northwest dragline remove top canal material prior to lining.



A water truck sprinkles canal banks ahead of the asphalt application.



An Etnyre distributor applies asphalt at 410 to 440 degrees.



A 25-foot boom supports the spraybar and hose.



Bucyrus-Erie 22-B draglines place cover material back on the asphalt membrane, dumping carefully to prevent damage to the asphalt.

hitch at each end. Two International TD-18's, working on each side of the canal, handled the roller. One machine let it down the slope with its rear-end winch, while the other pulled it up. As the tractors moved ahead, they lapped the roller over previously rolled grade. The canal was then ready for asphalt, and a 1,000-gallon water tank truck sprinkled just ahead of the asphalt crew. A 2-inch fire hose with a flattened fire nozzle delivered water, which was hauled from streams in the vicinity.

Asphalt Application: Asphalt equipment consisted of a 1,250-gallon Etnyre pressure distributor, with a LeRoi-driven Roper asphalt pump. On this distributor there was mounted a 25-foot boom, which swung out over the canal and supported the hose and distributor bar. The 17-foot shop-made spraybar contained 3/16-inch asphalt "snivvies" on 6-inch centers. It was 2 inches in diameter, and was connected to the distributor pump by a 2-inch Standard steel hose. The spraybar was made up in sections 2 and 3 feet long for easy assembling.

The asphalt was a 50 to 60-penetration product, catalytically blown with phosphoric pentoxide to increase its toughness and resiliency. The Cody, Wyo., refineries of Husky Oil Co. supplied this material, and the Billings trucking firm of H. F. Johnson did the hauling in three 5,000-gallon tankers, specially insulated with glass wool to preserve the blistering-hot delivery temperature of 500 degrees.

USBR specifications called for 1 1/4 to 1 1/2 gallons per square yard. To apply this quantity properly, the sides were shot three times and the bottom twice. An 8-man crew applied the membrane. Assisted by a Bros circulating heater, the pressure distributor took asphalt from the delivery tankers and hauled it to the application point. Workmen swung the boom out in position, and a man on each end of the distributor bar controlled its distance from the ground by holding one end up with a rope—a winch on the distributor controlled the height of the bar itself. The distance from the ground was a critical item. When the air was calm and no hard wind was blowing, 12 inches was about right. When the spring winds began, the men had to move the bar down closer to the ground.

The catalytically blown asphalt was a tricky, hard substance to handle. It was delivered to the transports at 500 degrees, and went down on the canal at from 410 to 440 degrees. It would freeze at the slightest provocation, and could scarcely be pumped much cooler than 375 degrees. One transport truck accidentally loaded up one day at Cody with 500-degree asphalt, and its rear valve was open. Instead of spilling all over the place, the asphalt immediately froze and plugged the valve. The truck made it to Riverton without spilling a drop, and when it got there men had to heat the valve to loosen the plug.

After every distributor load was emptied, the distributor bar was lubricated with diesel fuel, and the bar was always carried with the spray tips up whenever the rig was idle. Even so, one of the toughest problems was to keep the spraybar and asphalt lines open.



C. & E. M. Photo

While the Etnyre distributor replenishes its supply of asphalt, key men on the canal lining job talk things over. Left to right are James Comer of the USBR, Foreman F. E. Glasgow, and Ralph Studer.

They did it only by exercising the utmost care.

For close-in work around structures, bridge abutments, and the like, a small hand-held spraybar with 2 to 3 spray tips did the work. This rig was also used for miscellaneous patching which was sometimes necessary, especially when asphalt shooting was done in a high wind.

Despite its high application temperature, the finished asphalt membrane was tough, rubbery, and resilient. It showed no tendency toward brittleness, and samples exposed to atmosphere for over a year showed few if any signs of oxidation. Due to the short time limit, asphalt work was done 10 hours a day 7 days a week, weather permitting. On average days, the crew placed about 10,000 gallons of the membrane material.

Dirt Re-Covering: Following closely behind the final asphalt application came two Bucyrus-Erie 22-B draglines, which worked with 40-foot booms and

(Concluded on next page)

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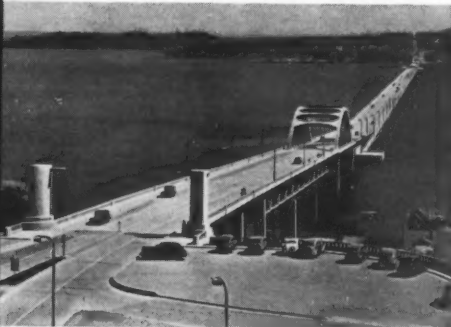
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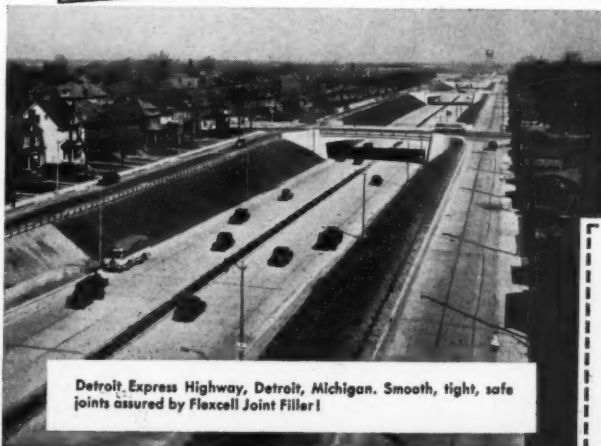
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Asphalt Lining Will Check Canal Seepage

(Continued from preceding page)

$\frac{3}{4}$ -yard buckets. They picked up the stockpiled dirt and placed it back over the asphalt membrane. In order to protect the asphalt as much as possible, they gently placed the slope material slightly ahead of the bottom. Then, if any rock material should fall out of the buckets while the machines were swinging to the bottom, it fell on an earth blanket instead of the asphalt. The dirt was placed generally up the slope; dumping was done very carefully to prevent damaging the asphalt.

The replaced material was then redragged with the same TD-18 and cat tracks which dragged the slopes and bottom originally. Finished thickness was usually 1 foot of cover over the asphalt.

Gravel Blanket: Wave action and hydraulic scour have so far been enemies of asphalt-membrane lining. To counteract the tendency of waves and running water to slough the earth cover away, exposing the membrane, the USBR placed about 23,000 cubic yards of pit-run gravel cover material over the dirt. Two pits were available to Studer. The material was excavated by the two C Roadsters, and then the loads were completed by a $\frac{3}{4}$ -yard dragline. The gravel was dumped ahead of the 22-B draglines, and they spread it over the earth cover. It is expected that this extra ballast will resist wave action and maintain the canal cross section even at high water level.

The contract also called for some riprap at several drop structures along the canal. Gilpatrick Construction Co. of Riverton supplied this material, and the job was unusual because the rock involved a haul over 50 miles one way.

May Solve a Problem

The use of asphalt-membrane linings, especially in smaller canals and laterals, may well solve a tough water-distribution problem in the arid west. The canals in these contracts are from 14 to 26-foot bottom-width ditches, have 9-foot water depths, and the side slopes are $1\frac{3}{4}$ to 1. Western farmers and the new homesteaders on the Riverton Project particularly realize the value of every drop of water, and the protection against seepage certainly seems to be a key link in the chain for



C. & E. M. Photo

This group photo shows, left to right, Ralph Studer, Mrs. Ruth Lichty, M. T. Lichty, Jr., L. W. Martin, and Michael H. Lichty.

getting the water to the roots of growing crops . . . where it counts.

It is believed that the watertight delivery vessels which Studer's men have been building will provide at small additional project cost a much more efficient utilization of available water in the Riverton Project.

Personnel

Ralph Studer, President of Studer Construction Co., supervised field work. Voris Brasel and Mike Lichty supervised excavation, dragging, and rolling on their work. And all oiling was under the supervision of F. E. Glasgow of Studer Construction Co. The top men of Brasel & Whitehead were also on hand.

The Riverton Project is being pushed under the general supervision of Chief Engineer L. N. McClellan of the Bureau of Reclamation. Directly in charge is R. H. Davidson, Project Manager, Riverton Project. Kenneth F. Vernon at Billings is Regional Director. Lyle Mabbott is Field Engineer.

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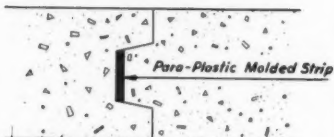
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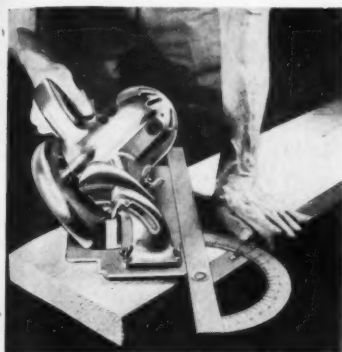
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Angle cuts are fast and accurate with the Saw Protractor, says Black & Decker. It is adaptable to most portable electric saws.

New Saw Guide Gives Accurate Angle Cuts

The Saw Protractor introduced by The Black & Decker Mfg. Co., Towson 4, Md., is used as a guide in power sawing. With it, the operator can cut practically any angle accurately and easily, the company says.

Sturdily constructed of metal for rigidity, it weighs 1½ pounds. It consists of a straight edge, a segment clearly calibrated in units of one degree, and a movable holding arm. The desired angle is set by loosening a wing nut on the under side of the holding arm and moving the arm until the indicator points to the desired angle mark. The wing nut is then retightened to prevent slippage.

In operation, the side of the shoe of the power saw is lined up with the Protractor's straight edge and the saw is advanced along this edge. On many power saws either side of the shoe can be used, depending on the cut desired. The manufacturer says that the Saw Protractor is particularly useful for compound miter cuts when used in conjunction with the bevel adjustment on most power saws. It is adaptable to practically all portable electric saws.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 220.

Weed-Control Booklet

A 32-page booklet with up-to-date information on chemical weed killers has been prepared by Chipman Chemical Co., Inc., 44 Factory Lane, Bound Brook, N. J. It explains what the chemicals are, what they are used for, and how to use them. It also contains illustrations and information on the most troublesome weeds and grasses found in this country, and on control measures. Similar data are given on methods of destroying brush, shrubs, and trees.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 145.

Transmission Belting

A concise technical bulletin on flat transmission belting has been prepared by Thermoid Co., 400 Whitehead Road, Trenton, N.J. It gives complete formulae, charts, and tables for the selection of belting to meet individual

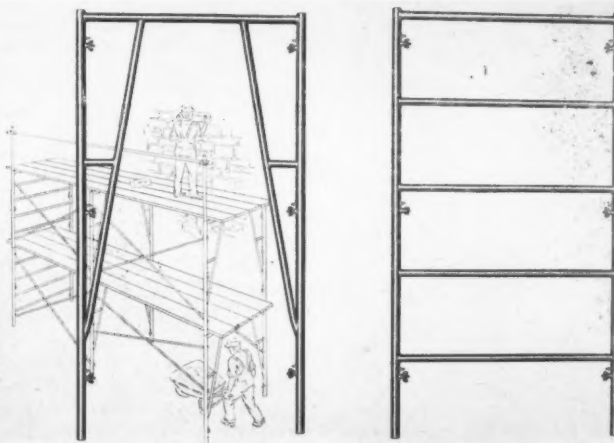
requirements. In addition to general information on belting, the 8-page loose-leaf-type folder catalogs the various Thermoid beltings. Each product is illustrated and described; available sizes and specifications are listed.

This literature may be obtained from the company by requesting Form No. 3678, or by using the Request Card at page 16. Circle No. 108.

Two New End Frames

Two new types of end frames for light commercial builders and mason contractors have been added to the line of tubular steel scaffolding made by Bil-Jax, Inc., Archbold, Ohio. The frames are each 36 inches wide x 6 feet high, and are interchangeable.

One frame, a ladder-type, is used at the ends of the scaffolding to eliminate separate ladders. The other is open-type to permit passage underneath. The frames are combined into towers by attaching diagonal braces. The patented brace lock makes it unnecessary



Bil-Jax has added these two new types of end frames—one ladder, and the other open-type—to its line of tubular steel scaffolding.

to remove wing nuts in attaching or removing braces. All joints are electrically welded.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 191.

OLIVER DIESEL POWER

**Handles
Bigger
Loads

AT LOWER
FUEL COST**

25,000 lbs.
GASOLINE POWER

39,000 lbs.
DIESEL POWER

What better proof could you ask of the economy you get with the new Oliver "88" Diesel Wheel Tractor? On this job an "88" Diesel is handling *two* rubber-tired compaction rollers vs. a gasoline powered tractor of equivalent size pulling *one* roller. The owner reports a fuel cost saving of 50% even though the Diesel model was pulling a load of 39,000 lbs. vs. the Gasoline model pulling a load of 25,000 lbs.

The new Oliver "88" is a natural for industrial wheel tractor operations. It's remarkably

easy to start . . . requires no starting preparations. Overall efficiency is high due to superior air and fuel mixture. Efficient burning of fuel and air assures exceptional fuel savings. Prolonged piston head pressure increases lugging ability under heavy loads.

You'll find it will pay dividends in increased load handling ability . . . lower operating costs to investigate the new Oliver "88" Diesel Industrial Wheel Tractor. Your Oliver Industrial Distributor will give you the complete story.

NAMEPLATE and IDENTIFY Your EQUIPMENT

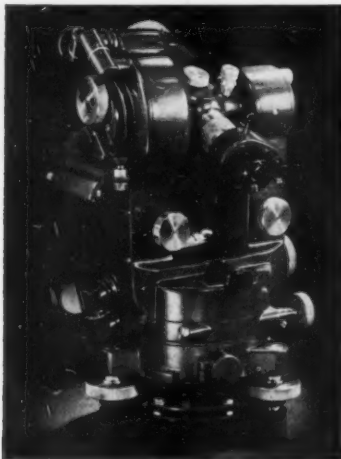
WITH CHICAGO DECALS

Durable—Quickly Applied
Most Economical
For Information and Samples Write:
CHICAGO DECALCOMANIA CO.
3910 N. Elston Ave., Chicago 18, Ill.

THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio
A complete line of Industrial Wheel and Crawler Tractors





Compactness and direct reading to seconds are features of the new Microptic theodolite No. 2. Clamped in its metal carrying case, it weighs 17½ pounds.

Compact Theodolite For Secondary Survey

The new Microptic theodolite No. 2, introduced into this country by Jarrell-Ash Co., Instrument Division, 165 Newbury St., Boston 16, Mass., is designed with direct reading to seconds and is recommended by the company for all work up to and including secondary surveys. The unit is extremely compact. Its optical and mechanical systems are enclosed within a body on which unnecessary projections have been avoided. Securely clamped in a light metal carrying case, it weighs 17½ pounds.

The instrument features an easily read optical system giving the mean of diametrically opposite readings on the circle. It has a single screw-focusing circle reader, giving one position only and quick change from horizontal to vertical. The telescope has a 27-power magnification and transmits from both ends. It has built-in illumination for the circles, telescope graticule, and plate and altitude bubbles. It also features a built-in optical plummet and coincidence setting for the altitude bubble.

A complete range of auxiliary equipment for transverse surveying and base-line measurement is available, as are tripod and targets. The company is also introducing the Microptic theodolite D 50 which reads directly to one minute and by estimation to 0.1 minute, and the Microptic theodolite No. 1 which reads directly to 20 seconds and by estimation to 5 seconds. Traverse models of both are available for use with the universal traverse equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 113.

New Hoe-Type Mixer

A hoe-type mixer designed primarily for inside work has been placed on the market by Construction Machinery Co., Glenwood and Vinton, Waterloo, Iowa. The Hoe Boy—a 3-cubic-foot-capacity mixer—is 29 inches wide, has a 36½-inch charging height and a 15-



This CMC Hoe-Boy 3-cubic-foot-capacity hoe-type mixer is designed for inside work.

inch discharge, and may be powered by a 2.4-hp Briggs & Stratton air-cooled engine or a 1-hp ac motor. It has adjustable triple-blade mixing hoes, a safety grating and a bag splitter, self-aligning self-lubricating shaft bearings, a heavy-duty electric-welded frame, machine-cut sprockets, a roller-chain drive, and "triple hoe" action.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 138.

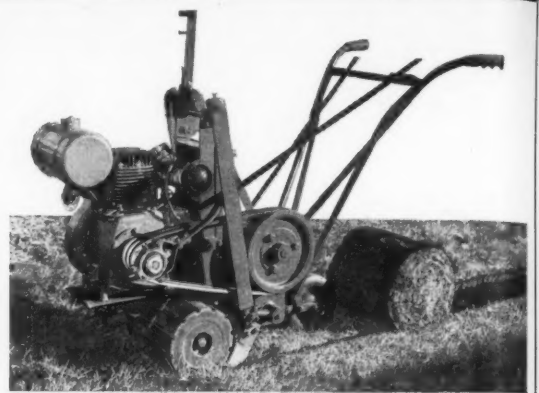
Tools and Attachments For Woodworking Machines

A new illustrated catalog on tools and attachments for woodworking machines is available from DeWalt Inc., Lancaster, Pa. It features jig saws, lathes, belt sanders, table tops, safety saw blades, and many other items. The 12-page folder includes descriptions, specification tables, and sketches.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 101.

SAVES
Up to 80%
of
labor costs

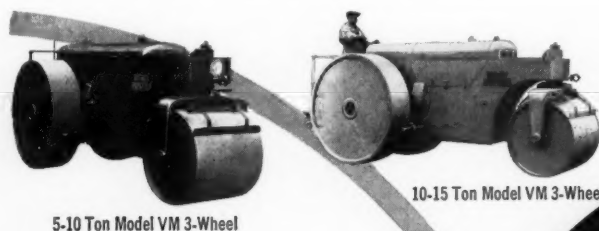
ONE MAN
cuts
600 sq. yds.
of
sod per hour



THE RYAN POWER SOD CUTTER
solves the sod lifting problems of the modern landscaping contractor.
Ruggedly constructed to give many hours of trouble-free service.

Write for folder.

K & N MACHINE WORKS, INC. 871 Edgerton St.
St. Paul, Minn.



5-10 Ton Model VM 3-Wheel

10-15 Ton Model VM 3-Wheel

IN ROLLERS...IT'S

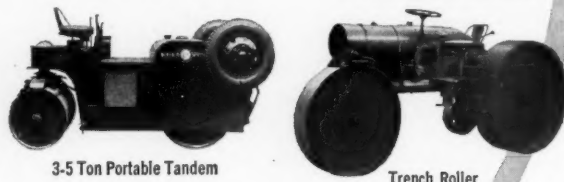
Buffalo-Springfield

**STANDARD
OF COMPARISON
THE WORLD OVER**



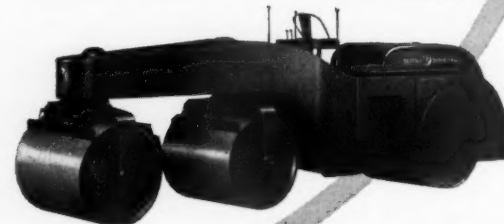
5-9 Ton Heavy Duty Tandem

8-14 Ton Heavy Duty Tandem



3-5 Ton Portable Tandem

Trench Roller



KX 3-Axle Tandem

There's an authorized
Buffalo-Springfield distributor
conveniently located to serve you



You own the *best* in roller equipment—for less per year than cheaper rollers—when you own Buffalo-Springfield.

That's because Buffalo-Springfields are built to *last longer*—cost less to operate and maintain. They're extra rugged, sturdy, dependable. Made in a variety of types and weights to meet every compaction need, by the world's largest exclusive manufacturer of road rollers.

Buffalo-Springfield service excels also. Buffalo-Springfield distributors in all 48 states and Canada feature modern facilities and complete stocks of genuine factory parts to keep your equipment rolling up profits.

Better see your Buffalo-Springfield distributor before you buy. Or, write the Buffalo-Springfield Roller Co., Springfield, Ohio, for full information.

BUFFALO  **SPRINGFIELD**
SPRINGFIELD, OHIO

WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF ROAD ROLLERS.

Plenty of Equipment Speeds Widening Job

Two-Foot Strip Added on Each Side of Ohio Highway; Full 24-Foot Pavement Surfaced With Asphaltic Concrete

(Photo on page 1)

• THE intensive use of specialized equipment for widening operations played a big part in the recent improvement of a 3.6-mile stretch of State Route 14 in northeastern Ohio. The rebuilt section in Summit County begins at the Cuyahoga County line and runs southeast to Twinsburg, ending at State Route 91. It was widened from 20 to 24 feet, and then resurfaced with asphaltic concrete. The McCourt Construction Co. of Akron, Ohio, performed the work under a \$102,112.40 contract to the Ohio Department of Highways. Incidentally, the low four bids for the job were closely bunched, and all were under the engineers' estimate of \$116,600. Less than \$300 separated the winning bid from the second-lowest.

State Highway 14 is heavily traveled, being the most direct route between Pittsburgh and Cleveland. It is old, as roads go, dating back to 1915, with an original width of 14 feet, and surfaced with brick like most of the early highways in Ohio. This course of brick, 4 inches thick, was set on a 2-inch cushion of sand laid on a 4-inch concrete base. Along each side ran a stone curb, 4 inches wide x 16 inches in depth.

After ten years of service the road was widened in 1925 to 20 feet. On one side only, a widening strip was added, consisting of a 6-inch macadam base topped by 3 inches of bituminous macadam. This was buttressed with a 15 x 12-inch concrete curb, a similar curb being laid on the opposite side to butt against the original stone curb. These new curbs extend above the old pavement to serve as a form for the resurfacing that consisted of a slag cushion covered by 3-inch brick with bituminous filler. This pavement held up until 1939 when it was resurfaced with a 2½-inch course of asphaltic concrete, but no widening was attempted at that time.

GRACE TRACTOR SWEEPERS



Fit Most Wheel Tractors

Sweep right or left

6' or 8' overall width

GRACE CHIP SPREADERS



For Fast Uniform Coverage

On Seal Coat Jobs

Built-in trailing equipment

Folding operator platforms

Timken bearing wheels

Tires changeable without deflating

W. E. GRACE MFG. CO.

5990 S. Lamar St.

Dallas, Texas

Road Widening

After a little preliminary work of extending some drainage facilities, the McCourt Construction Co. began its widening operations last August 2. By the end of the month the widening and the 24-foot resurfacing were completed. The widening trench for the 2-foot strip added on each side was excavated to a width of 2 feet 8 inches x 14 inches deep.

First the hard-packed berm or shoulder was scarified by a Caterpillar

(Continued on next page)



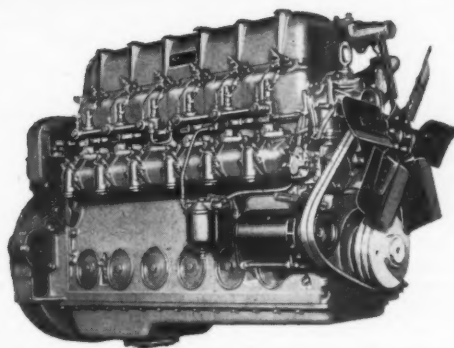
C. & E. M. Photo

A spreader lays the first course of slag in the widening trench on Ohio Route 14.

P&H

DIESEL ENGINES

2-CYCLE



MINUTES...NOT HOURS!

REPLACE THIS COMPLETE CYLINDER ASSEMBLY

Here's something you can't do with any other diesel. The P&H cylinder assembly (comprising head, liner, piston and rod) fits *any* P&H Model — 1, 2, 3, 4 or 6-cyl. It's built as a unit; stocked as a unit; installed as a unit — anywhere — in minutes . . . not hours or days! Think what this can mean to you in time and money saved. No wonder more and more diesel users are standardizing on P&H Diesels. For literature, write

Diesel Division, Harnischfeger Corporation,
Port Washington, Wisconsin.



Plenty of Equipment Speeds Widening Job

(Continued from preceding page)

No. 10 Auto Patrol which was followed by a Caterpillar No. 12 motor grader equipped with a drop blade on its mold-board. Only part of the dirt was removed by these two machines, the remainder of the trench being dug by a Buckeye trencher geared to some adaptations of the contractor. The machine was pulled by an Army half-track with rubber cleats on the rear assembly. The front end of the half-track was loaded down with a dozen short I-beam sections as a counterweight to the heavy trencher at the rear. From the trencher wheel a conveyor belt, 15 feet long x 18 inches wide, extended upward and to the rear. The conveyor was suspended through a Yale ½-ton hoist from an arm cantilevered out from the framework over the trencher wheel. The overhead arm was made up of a pair of channels fastened together back to back.

Material dug to form the trench was either thrown off at one side of the roadway, or else moved up the conveyor belt and thence into dump trucks that backed along the edge of the road directly behind the unique excavator. The usual procedure was to throw the dirt off to the side when working in fill sections, thus building up the berms to the desired 5-foot width. In cuts, the excavation was diverted up the belt into waiting trucks so as to keep the ditches from getting filled with dirt. In some fill locations, where the berms were wide enough and up to the desired grade, the material was sent up the belt and hauled away in trucks.

Granulated-Slag Base

Widening was done on the west side of the roadway first, with the operations proceeding from south to north. In this way the movement of the line of equipment up the side of the pavement was always against traffic, thus making for better safety. With the two graders and special excavator, little hand work was required in the final shaping of the widening trench. The subgrade at the bottom of the trench was rolled by a Galion trench roller, the big wheel being 20 inches wide and 3 feet 6 inches in diameter. Two courses of granulated slag, each compacted to a 4-inch thickness, were laid as a base. The Standard Slag Co. of Cleveland supplied the material, which was delivered to the job in a fleet of 10 to 15 hired trucks holding up to 10 tons. The first course was rolled by the same trench roller used on the subgrade. For compacting the upper course, a new Apco trench roller was used having a wheel 20 inches wide x 6 feet in diameter.

The slag was laid with shop-made spreader boxes that fastened to the rear of the trucks and were pulled along over the pavement. The material slid out through the tailgate into the spreaders, and was moved along by a worm gear to the box at the side which laid the slag to a width of 2 feet 8 inches. For better compaction each lift of slag was sprinkled with water to lubricate the particles. To speed the base-course work, enough equipment was mustered into service to lay both layers of slag at the same time, the upper course following closely behind the lower course.

After the large-wheel roller had finished compacting both courses to the full 8-inch depth, a 600-gallon shop-made distributor sprayed the exposed face of the adjoining concrete curb with an asphalt emulsion. Thus the bituminous leveling course that followed was well bonded to the bare concrete. The bitumen seal was not applied until after the compaction of the slag was finished, so that the roller wheels would not scrape from the concrete any of the emulsion. A hand hose was used for

spraying the vertical face of the curb.

Leveling and Resurfacing

On top of the granulated slag went 6 inches of asphaltic concrete, laid in two 3-inch compacted courses to a width of 2 feet 3 inches in the widening trench. The material was supplied by the Twin Lakes Sand Co. near Kent, Ohio, and was made of sand and gravel, graded from 1-inch down, mixed with asphalt cement of 70-80 penetration. Up to 25 hired trucks hauled the plant mix used in the widening and resurfacing operations, averaging 7½ tons a load on a 15-mile average haul. It was laid with spreader boxes, with the initial course being compacted by a trench roller. On the second course, which brought the trench up level with the original pavement, the compacting was done by a Buffalo-Springfield 3-wheel 10-ton roller.

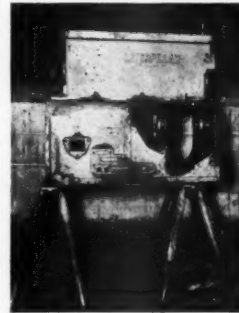
Any major depressions in the existing pavement were then filled and compacted with bituminous-concrete leveling material in advance of the reg-

ular leveling course. In no case was any layer put down exceeding 3 inches in compacted thickness. The regular leveling course, 1¼ inches thick for the full 24-foot pavement, was the same composition as the material used in the trench. The asphaltic-concrete surfacing course, also 1¼ inches thick, that was laid over it, conformed to the same gradation but was made with limestone aggregate rather than sand and gravel.

Bitumen with the same penetration was used.

Before the leveling and surfacing courses of the pavement were laid, the road was carefully swept by a Little Giant rotary broom mounted on the front end of a Minneapolis-Moline rubber-tired tractor. Barber-Greene Finishers did the blacktop work, putting on the leveling course in 12½ and

(Concluded on next page)



GUTH . . . rebuilds diesel castings

guaranteed to be equal to, or better than, new castings! Popular cylinder heads for exchange shipments are available for immediate delivery.

GUTH COMPANY
MEMPHIS, TENNESSEE

WRITE FOR CIRCULAR
SERVING THE NATION FROM ITS CENTER
WRITE FOR ADDRESS OF NEAREST DEALER



THE DEMPSTER-DIGGSTER, Type GRD, same as the one that loaded 600 tons of stone recently, has a 15 foot six inch turning radius, is 20 feet long when bucket is in traveling position, and bottom of bucket

is nine feet three inches above ground when in extreme dumping position. It will dig 15 inches below grade and through a 15 foot bank. Note how bucket follows the slope of the material.



THIS DEMPSTER-DIGGSTER, Type HL, is specially equipped for high dumping. The bottom of the bucket is 13 feet six inches above ground. It will dig through an 18 foot bank.



FOR FAST, EFFICIENT operation in difficult terrain, the Dempster-Diggster is available with crawler-type traction.

Fast Automotive Shovel Loads 600 Tons of Stone in Half a Day

CONTRACTOR REPORTS: HYDRAULIC CROWD, HOIST
UNIT "FILLS LONG NEEDED PLACE IN OUR INDUSTRY"

THE DEMPSTER-DIGGSTER, a revolutionary shovel loader, recently loaded 600 tons of broken stone in the first half day of operation. This outstanding performance was reported to Dempster Brothers, Inc. by W. E. Lambert, president of Lambert Brothers, Inc., one of the nation's largest crushed stone contracting firms.

"In connection with our extensive activities in several southern states," the contractor said, "we have used various types of power shovels and front end loaders. After seeing the easy operation of the hydraulically operated Diggster in a demonstration we had made alongside of a competing loader, we placed an order with you. We installed the Diggster equipped with a yard and half stockpile bucket on one of our operations in western North Carolina.

"Our records show," he continued, "that the unit loaded approximately 600 tons of broken stone in the first half day of operation. The Diggster has been working continuously and is giving perfect satisfaction. It is a pleasure for us to so advise you because in our opinion the Diggster fills a long needed place in our industry. We welcome you to bring

any interested parties to our operation to see the Diggster in action."

The tremendous speed of the Dempster-Diggster in excavation and stockpile work is accounted for, mainly, by its exclusive independent hydraulic crowd and hoist action, the hydraulic steering, and wheel-type traction, which permits truck speeds to and from jobs. The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver easy, fast, finger-tip control.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and 1¼ cubic yard (heaped) capacities; materials handling buckets in 1½ and 2 cubic yard (struck) capacities.

Complete information and prices may be obtained by writing the manufacturer, Dempster Brothers, Inc.

**DEMPSTER
DIGGSTER**

DEMPSTER BROTHERS

461 Shea Bldg.

Knoxville 17

Tennessee

on was
riacing
aid, the
Little
on the
Moline
Greene
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½ and

11½-foot lanes, and the surface course in two 12-foot lanes. In this way the joint was not brought up through to the center line of pavement. Rolling was done by Buffalo-Springfield rollers — tandem and 3-wheel models weighing 10 tons. An average of 1,200 tons of material was put down in an 8-hour day.

Quantities and Personnel

The major items in the 3.6-mile widening and resurfacing contract include the following:

Asphaltic-concrete surface course	1,834 cu. yds.
Asphaltic-concrete leveling course	4,084 cu. yds.
Granulated-slag base course	10,872 sq. yds.
Roadway excavation	3,642 cu. yds.
Bituminous seal	36,720 lin. ft.

At the peak of operations the McCourt Construction Co. employed an average force of 25 on the job, working a 5-day week. Fewer were required once the widening was completed. Progress was steady despite the requirements of maintaining one-way traffic at all times. A. L. "Red" Eversman was Superintendent for the contractor.

For the Ohio Department of Highways, Bob Thompson was Project Engineer; the job was located in the Fourth Division of which W. L. Turner is Division Engineer with headquarters at Ravenna. The Department is headed by T. J. Kauer, Director, with Howard R. Craig, Chief Engineer of Construction.

Chain-Saw Bulletin

A circular describing chain saws with both bow attachments and straight guides is available from Poulan Saw Co., Inc., P. O. Box 3524, Shreveport, La. It illustrates the saw and many of its component parts, and outlines construction and operating features. The bow attachments are available in sizes of 18, 21, 26, and 33 inches. The straight guide may be had in sizes of 24, 34, 44, 54, 64, and 74 inches.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 115.

Engineers Are Needed

The Engineering Manpower Commission of the Engineers Joint Council sent over 23,400 leaflets to high-school principals urging them to direct qualified seniors into engineering schools. The Commission estimates that more



C. & E. M. Photo

An Apasco roller with a heavy wheel 20 inches wide x 6 feet in diameter compacts the second course of slag in the widening trench.

than 30,000 engineers should be graduated each year if we are to out-design, out-develop, out-produce, and out-perform the USSR. It quotes the U. S. Bureau of Labor Statistics: "Despite rec-

ord graduations over the last few years, industry is seeking additional personnel, particularly for the defense program. . . . Those now planning to enter engineering schools should find good

employment prospects when they finish their courses."

This year 30,000 engineers will be graduated, but according to present enrollment figures the number of graduates in 1954 will be down to about 17,000. This decrease is caused in part by the fact that most veterans have completed their courses and in part, says the Commission, by unfounded rumors that the engineering field was over-supplied.

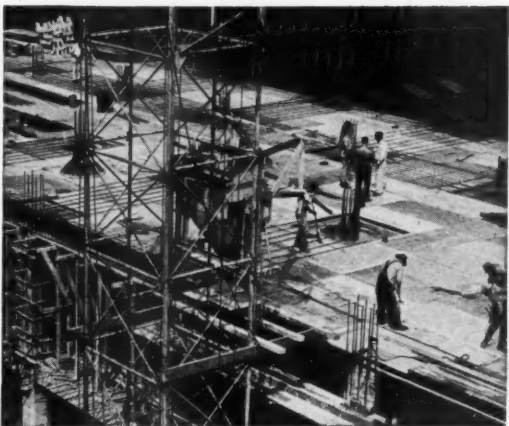
Orange Peel Buckets

A flyer describing orange peel buckets is available from N. P. Nelson Iron Works, Inc., 820 Bloomfield Ave., Clifton, N. J. These buckets come in 15 and 18-inch diameters, with a capacity of 1½ and 1¾ cubic feet respectively. Data concerning their construction and dimensions are given, along with illustrations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 199.



Clean, smooth beams and bridge piers



Smooth concrete industrial building surfaces

Freedom from staining on apartment project



formfilm

Protective Coating for Plywood Forms

All over America contractors report that Formfilm is the answer for the protective coating of plywood forms. Formfilm eliminates all oil staining and sharply reduces rubbing costs.

Advantages of Formfilm

- Increases speed of form handling
- Increases use of forms without recoating
- Increases life of forms—no grain raising
- Eliminates all disadvantages of oil or oil deposits on concrete.
- Cleaner, smoother surfaces at lower cost

THE RED U-BOLT TELLS YOU



- 1 They're drop-forged
- 2 Hot dip galvanized
- 3 They're genuine

CROSBY CLIPS



- 4 They're America's largest-selling DROP-FORGED WIRE ROPE FASTENERS DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA

A. C. HORN COMPANY, INC.

MANUFACTURERS OF MATERIALS FOR BUILDING MAINTENANCE AND CONSTRUCTION
10TH STREET & 44TH AVENUE, LONG ISLAND CITY 1, N. Y.
LOS ANGELES • SAN FRANCISCO • HOUSTON • CHICAGO • TORONTO
SUBSIDIARY OF SUN CHEMICAL CORPORATION



CE-51

GENTLEMEN:

Please send complete data on FORMFILM

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

Distributor Doings

Open-House at Miller-Ward

Miller-Ward Machinery Co., Allis-Chalmers distributor in Tyler, Texas, held an open house on May 10. Guests were treated to one of those Texas barbecues and an equipment demonstration.

Haungs Represents Caterpillar

R. C. Haungs is now a district representative for the Caterpillar Tractor Co., Peoria, Ill. He will be responsible for contacting distributors in New York, Vermont, New Hampshire, and Connecticut. Dealers include T. Southworth Tractor & Machinery Co., Inc., Albany, N. Y.; H. O. Penn Machinery Co., Inc., New York City; Vincent S. Jerry & Sons, Inc., Plattsburg, N. Y.; Syracuse Supply Co., Syracuse, N. Y.; and Casellini-Venable Corp., Barre, Vt.

Mr. Haungs was formerly an accountant with the Carolina Tractor & Equipment Co., Caterpillar dealer in Salisbury, N. C.

Florida Dealer for Rosco

Square Deal Machinery & Supply Co., Orlando, Fla., is an exclusive distributor for Rosco Mfg. Co., Minneapolis, Minn. It handles Rosco bituminous distributors, street flushers, supply tanks, maintenance units, road brooms, tar kettles, and power pumping units. T. M. Deal, Sr., is President of the dealer company. Henry S. Duttweiler is Vice President and General Manager, and Troy M. Deal, Jr. is Secretary-Treasurer and Sales Manager.

Square Deal also represents Allis-Chalmers Mfg. Co., Link-Belt Speeder Corp., LaPlant-Choate Mfg. Co., Construction Machinery Co., General Motors Corp., DeSoto Foundry, Inc., Jos. F. Kiesler Co., Owen Bucket Co., Drake-Williams-Mount Co., Erie Steel Construction Co., Transport Trailers, Inc., Joy Mfg. Co., Wm. Bros. Boiler & Mfg. Co., Muller Machinery Co., and Union Wire Rope Corp.

New Plant for Utility Trailer

Utility Trailer & Equipment Co. has built a spacious plant in the heart of Seattle's trucking, motor freight, and construction district. The plant is of

arched-truss design. Each side has four doors with a 16-foot clearance and an overhead crane in each bay permits body and hoist mounting in any location. Space for parking and storage is provided by 125,000 square feet of yard area.

Karl P. Heideman is President and General Manager of the firm and Frank Hart is Sales Manager. The company is the Heil dealer in the Washington area.

Three Dealers for Chain Belt

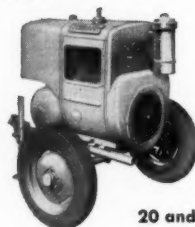
The Chain Belt Co., Milwaukee, Wis., has added three dealers to its list. Illinois Road & Equipment Co., 1310 E. Jefferson, Springfield, Ill., will handle Chain Belt products in the Illinois counties of Adams, Pike, Schuyler (Continued on next page)



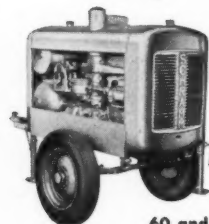
C. & E. M. Photo

Photographed at the April meeting of AED Region 2 in the Hotel Roosevelt, New York City: left to right, Region 2 Director E. H. Kliebenstein, AED Executive Vice President Harry Hush, AED Traveling Secretary Jack Randle, Ed. Stouffer of Smith Tractor & Equipment Co., AED President Ray Arnold, and Art Tajague of Ehrbar Equipment Co.

from the ground up—

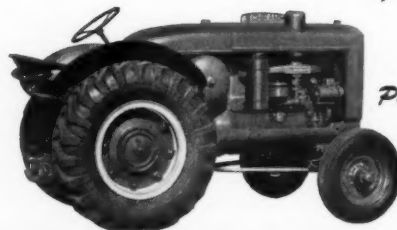


20 and 35



60 and 105

Pneumapower



60 and 105

Pneumatractor

There's a **SCHRAMM** Air Compressor to fit your air needs!

MODELS 20 and 35... for Tire Inflation, Scaling, Impact Wrenches, Grease Guns, Paint Sprays and Road Markers.

MODELS 60 and 105 Pneumapower... For jobs where large compressors are not required; Riveting, Tamping, Waterproofing, and Insulating.

MODELS 60 and 105... **Pneumatractor** Self-Propelled. For Trench Work, Loading and all air applications.

MODEL 105 Unistage... Equipped with large size tool boxes capable of hauling complete assortment of construction tools.

MODELS 210, 315 and 600... Large compressors for operating multiple tool combinations on big engineering projects.



TO GIVE YOU A COMPLETE PACKAGE

The Schramm line of Construction Tools includes: Rock Drills... Wagon Drills... Paving Breakers... Clay and Trench Spades... Backfill and Tie Tampers... Track Spike and Form Pin Drivers... Sheet Pile Drivers... Chain Saws... Concrete Vibrators... Paint Sprays... Tools for Breakers and Diggers... Air Hose and Accessories.

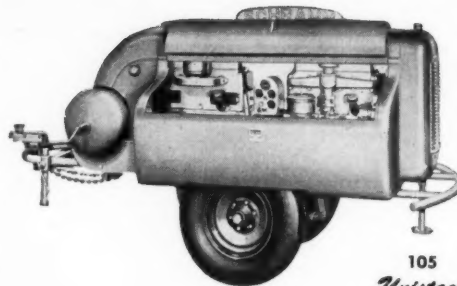
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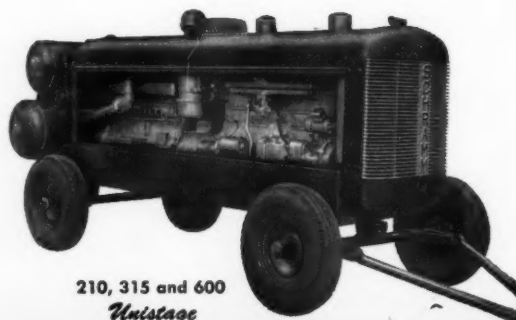
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C. & E. M. Photos

Equipment exhibits and demonstrations were part of the 12th Annual Highway Engineering Conference of the University of Utah last April (see C. & E. M., May, pg. 68). At right is the Arnold Machinery Co. exhibit in the Coliseum. Above, an Eagle loader of Western Machinery Co. puts on a windrow-loading demonstration.



Brown, Scott, Green, Morgan, Macoupin, Mason, Menard, Sangamon, Montgomery, Christian, Logan, DeWitt, Machon, Shelby, Moultrie, Coles, Cumberland, Clark, Cass, and Piatt.

The Rapid City, S. Dak., territory has been given to West River Equipment Co., 417 Pine St., in Rapid City. The J. P. Foster Co., 1001 E. 14th St., Sioux Falls, S. Dak., is handling Chain Belt equipment in Sioux Falls and surrounding territory.

Woods Appoints Matchette

The Paul L. Matchette Co. of Kansas City, Mo., now handles the Surfa-Slick self-heating asphalt-smoothing irons made by J. E. Woods Mfg. Co., San Fernando, Calif. The dealer company, which also carries a full line of asphalt plants and construction equipment, will cover the state of Kansas and the western half of Missouri for Woods.

Two Transitier Dealers

The Transitier Truck Co. has appointed two dealers in California. W. T. Billard, Inc., 734 E. 3rd St., Los Angeles, Calif., is handling the Hi Duty lift truck in southern California, and E. C. Buehrer Associates, Inc., 527 Folsom St., San Francisco, Calif., is the distributor in the San Francisco Bay area. Both dealer companies will supply parts and service facilities.

New Service Supply Dealers

Rish Equipment Co., of Richmond and Roanoke, Va., and Phillips Machinery & Tractor Co., of Alexandria, Va., and Baltimore, Md., are distributing the Lodover overhead and front-end shovels made by Service Supply Corp. of Philadelphia, Pa.

Heil Man Joins Innes

Henry Giles has left his position as Sales Manager of the Road Machinery Division of The Heil Co., Milwaukee, Wis., to become General Manager of J. S. Innes, Ltd., Heil road-machinery distributor in Toronto, Canada.

Huber Appoints Western Machinery

Western Machinery & Engine Co. of St. Louis, Mo., and Centralia, Ill., is handling building and maintenance equipment made by Huber Mfg. Co., Marion, Ohio. Its territory covers eastern Missouri and central and southern Illinois.

Hugh Scott, Sr., is President of the dealer firm. Gilbert A. Weidlich is Vice President; Gilbert J. Nichols, Secre-

tary and General Manager; John H. Heintz, Manager of the Construction Equipment Division; Melvin Lusader, (Concluded on next page)

Operators Agree... There's MORE PAY TIME with a Lull Shovel loader



LONG FORWARD REACH

Note how the Long Forward Reach of the Lull Shovel loader lets you get in close, handles big loads with ease, and permits minimum maneuvering.

MORE PAY MINUTES as fast hydraulic action and finger-tip control of both lifting arm and bucket saves time in positioning for each operation.

MORE PAY HOURS as longer higher reach ahead of radiator permits faster loading or piling... saves hours of maneuvering time.

MORE YEAR 'ROUND PAY TIME... digging... lifting... loading... transporting... scraping or bulldozing. A wide variety of interchangeable attachments make the Lull Shovel loaders the most versatile equipment you can own to give you more pay time with lower costs every day of the year.

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The Largest Line of Allied Equipment
for Industrial Wheel Type Tractors

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ACQUIRE competent personnel

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CONTRACTORS &
ENGINEERS MONTHLY

470 4th Avenue New York 16, N. Y.

Distributor Doings

(Continued from preceding page)

Manager of the Centralia branch; and Robert Gamel, Service Manager.

Dealer Uses Submerged-Arc-Welding Machine to Recondition Equipment

Now that conservation is back in the picture, automatic welding machines have entered the fields of repair and reconditioning. Peoria Tractor & Equipment Co., Caterpillar dealer in Peoria, Ill., uses its Leader machine to repair track rollers, idlers, carrier rollers, wear plates, cutting edges, and bits.

The submerged process, long used by manufacturers in the fabrication of structural members, is essentially the same as arc welding done by hand. It uses bare (uncoated) wire electrodes, producing an arc with the base metal



This badly worn DS tractor idler comes into the shop of the Peoria Tractor & Equipment Co., Caterpillar dealer. It has been caught in time.



The holes are filled with a weld patch on the inside, then the idler goes onto the submerged-arc-welding machine for weld overlays.



Here it is after the automatic welding, ready once more for use. The process is very fast—about 20 inches of weld a minute.

under a protective covering of molten flux. The molten metal is not exposed to air. The process is fast—20 inches of weld per minute. Because the welding head controls the arc voltage, current, and rate of electrode feed, welds are uniform in width and depth of penetration, as well as smooth in appearance.

Interstate Has Joy Line

Interstate Equipment Co., Statesville, N. C., is exclusive distributor in North Carolina for the construction equipment made by Joy Mfg. Co., Pittsburgh, Pa. Interstate's new quarters provide facilities for servicing and warehousing construction equipment.

Equipment Dealers—this is your department, so send your news—all about your new plants, new lines handled, new staff appointments.

Welders' Safety Clothing

A broadside describing a complete line of welders' clothing of chrome-tanned cowhide is available from American Optical Co., Safety Products Division, Southbridge, Mass. It covers gloves, mittens, overalls, coats, sleeves, aprons, and spats. Each piece of clothing is illustrated and briefly described; additional data are given on its safety and tailoring features.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 148.

Dave Baker Leaves I-H

D. B. Baker, Manager of Industrial Power Engineering for International Harvester Co., Chicago, Ill., retired last month after 47 years of service. He guided the engineering of the indus-

trial crawler and wheel tractors built by I-H. The innovations in crawler-tractor design that finally were incorporated in the TD-24 were his responsibility.

Now—more than ever!

smith

the money-saving

COMPRESSOR

smith MODEL 105-P

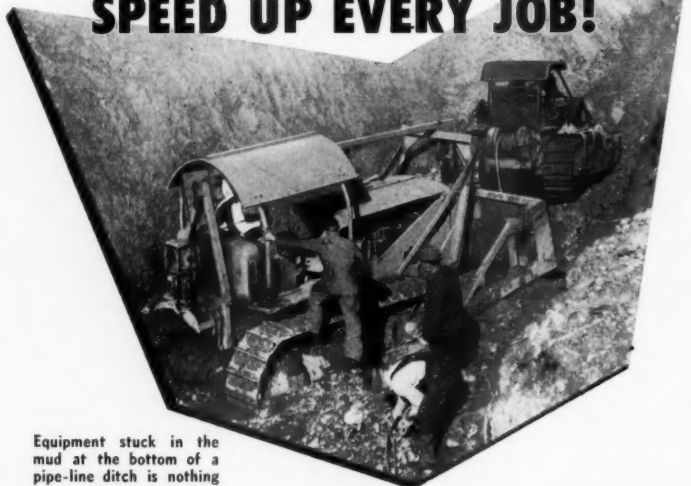
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Lower upkeep!

In high-cost times, look to the Smith for compressor savings! Delivers 105 cu. ft. per minute—combines heavy duty with light weight; easily portable. Powered with the Chrysler Ind. 15 Industrial engine—6 cyl., 4" bore, 5" stroke, 377 cu. in., 3" crankshaft, 7 main bearings, sodium cooled valves and Stellite valve seats for heavy duty, long life. Compressor valves—stainless steel disc type with Manganese Bronze seats. Improved type pilot valve and simplified control . . . Write for literature and prices.

Also the new SMITH 70-P AIR COMPRESSOR

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Equipment stuck in the mud at the bottom of a pipe-line ditch is nothing to worry about if you have a tractor equipped with a Carco winch!

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Winches for all makes of tractors

From the day you move in on a new project until the last bit of left-over material is hauled away, your Carco winch is the "pusher" that keeps other equipment working full time. It has the power and versatility needed in general contracting—clears land, wrecks or moves existing structures, tows heavy machinery—performs dozens of "bull-cooking" jobs. When you need it, it's there, yet it seldom requires attention and permits full, efficient use of the tractor for other purposes.

Because Carco builds more tractor winches than any other manufacturer, and for more makes of tractors, you're always close to a Carco dealer with parts, service, full data on any model.

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They USE Stapleton: The Mile-High Field

Maintenance of a Modern Air Terminal Combines Highway Engineering and Dressed-Up Diplomacy

• THE DC-6 roared off the Chicago runway and steadied as she became airborne. Her chief pilot, a veteran with thousands of air hours to his credit, settled back as the propeller pitch adjusted, and the DC-6 began to drone westward through the winter night. He looked at his copilot and smiled.

"I don't envy the folks in Iowa and Nebraska their weather tonight, Joe", he said. "How do you suppose Denver made out?"

"I don't know about downtown Denver, but Stapleton will be in the clear", said the copilot. "You can always use Stapleton."

In that chance behind-the-scenes remark lies a remarkable story of airport maintenance. Airline pilots usually know that Stapleton is one field they can depend on, fair weather or foul. What they may not fully appreciate is the organization and effort, on the part of the City and County of Denver, which keeps the asphalt runways velvet-smooth, the snow removed, the dust down, the field landscaped, and the building the envy of people all over Denver.

The maintenance of Stapleton Airfield, Denver's municipal airport, combines the best techniques of highway maintenance and engineering with a certain amount of diplomacy. For Stapleton's maintenance men, and their supervisors especially, have to deal with airlines, the public, concession holders, contractors, and materials-supply men.

A Field With a History

Denver has always been an air-minded city. Many years ago, when aviation was but a pup, Denver led the Rocky Mountain west in air facilities. During the 1930's Stapleton Airfield was developed as a modern airport of its day, and by the outbreak of World War II it served the major airlines then using Denver as a stopping point.

Immediately after World War II, the City and County of Denver began to develop Stapleton in line with long-range aviation plans. Grading and building contracts were let. By the end of 1950 the field had been enlarged enormously. It then had a large and modern administration building, control tower, various airlines offices and overhaul bases, a 1,750-acre tract of land, and 1,161,674 square yards of paved surface as follows.

Runways consisted of the old East-West, 150 x 6,475, and a new E-W runway 150 x 8,500. There was a 150 x 6,425 NE-SW runway. The N-S runway was 150 x 7,000 feet. And there was a NW-SE runway 150 x 7,015. All of these runways were connected by taxiways.

Paved space at that time was divided into four classifications. In the 5 asphaltic-concrete runways and warmup pads there were some 590,217 square yards. Four taxiways accounted for 92,712 square yards more. There were 43,145 square yards in a loading ramp, built with both asphaltic and portland-cement concrete. Another 435,600 square yards consisted of a portland-cement-concrete ramp and plane-parking area.

A few of the earlier paved areas, particularly in the old taxiways and the old E-W runway, consisted of bitu-

(Continued on next page)



C. & E. M. Photo

Denver's Director of Aviation D. G. Davis (at right, bareheaded) and Airport Manager Herman C. Gassert watch maintenance men apply hot-mix patching to a Stapleton Airfield taxiway.

For toughest conditions..

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A STEEL CORD TIRE

special for
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its walls are as flexible as those of
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A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

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Chicago, Ill.

MICHELIN

"METALIC" Y Tire

They USE Stapleton: The Mile-High Field

(Continued from preceding page)

minous mats laid down without special attention to subbase. But all of the postwar work was designed carefully by consulting engineers, and done by contract under careful inspection. Paved areas done by that method have good granular subbases under them. So far as the maintenance crews are concerned, they deal with both good and bad types of construction in the light of modern aircraft loading.

The history of Stapleton Airfield, too, must take into account the many changes in aircraft. At the outbreak of World War II the now-obsolete DC-4 had made but a few appearances. The small two-engined DC-3 was still the workhorse of the airlines. A few Boeing Stratoliners had made an appearance, but generally wheel loads were light.

In less than ten years that situation has changed enormously. The DC-6's,

Constellations, and other heavy aircraft have become commonplace. The Navy's Constitution has landed at Stapleton, and the field has also seen quite a few B-36's. Today five major airlines—United, Continental, Western, Braniff, and Frontier—use Stapleton Airfield. In the first 21 days of March, 1951, there were over 16,000 air operations . . . and March isn't a peak month!

Maintenance of Stapleton, then, is geared to preserve and improve Denver's investment while heavier and heavier aircraft use the field. Demands are getting heavier and heavier. High on the future construction priority list is a 1,500-foot extension to the E-W runway. DC-6's need 10,000 feet at this mile-high altitude to operate with a full load of passengers and cargo.

Maintenance Organization

The airfield maintenance organization is efficiently set up to take care of the field itself, and the buildings appurtenant to the field. D. G. Davis, Director of Aviation, has charge of

maintenance, administration, and liaison between the City of Denver and users of Stapleton Airfield.

Reporting to Davis is Herman C. Gassert, Airport Manager, who has direct supervision of maintenance. His crew is organized around 2 subforemen, 8 airfield maintenance men, 3 laborers, 4 semiskilled laborers, a chief and 4 stationary steam engineers, 4 firemen, one electrician, one painter, 3 special airfield police, 10 custodial workers for buildings, and 4 maids. Total authorization for a 53-person force has been granted by the City.

Drainage Improved

One of the first functions of maintenance work is to improve drainage from runways, taxiways, parking aprons, and the adjacent lands. The new construction of recent years has done a lot toward the improvement of the drainage pattern, but throughout the entire conception of routine maintenance runs a consistent regard for drainage. No matter what kind of sub-

base there is under any pavement, the maintenance men always try to prevent water from ever touching that base material.

Thus, in the case of snow-removal work, you see the snow pulled in from the edge of the pavement and then blown by rotary plows over to the drainage channels. The entire scheme of planting and weed control is aimed partly at stopping the water where it falls. Gassert is even an organic-agriculture enthusiast, and he is rapidly building up the organic quality of topsoil by adding compost, leaves, and other such plant substances.

Gassert also developed a type of concrete catch basin, covered with inverted railroad rails set flush with the concrete surface. They are low-cost structures, they catch water nicely, and they occupy a major position in the Stapleton drainage pattern. Large-diameter outfall lines were placed when the last large contracts for grading were done.

Bituminous Maintenance

A major portion of pavement maintenance consists of upkeep of asphaltic-concrete runways and taxiways. So far, by paying first attention to drainage, Gassert has been able to keep the subbases dry and in good shape. Pavement deterioration consists generally of oxidation of seal coats, the loss of surface chips through scuffing of tires and propeller air blasts, and some pavement cracking due to adhesion failure.

Where cracks occur, they are filled promptly by pouring hot asphaltic cement to fill the void. Cracks usually come in the coldest part of the winter, so during that season the maintenance men are especially vigilant to spot them and get them filled.

Weather conditions vary so much at Stapleton, and there are such extremes of low to heavy precipitation, that seal coats are a virtual necessity to make asphaltic-concrete pavements give their best service over a sustained period of years. Gassert has determined from long experience that airfield pavements under his supervision work best if they get a new seal coat every 4 years. Each year, therefore, one-fourth of the square yardage of bituminous pavement is seal-coated and recharged by contract.

As a general rule, Gassert uses about 0.25 gallon of RC-2 per square yard, with about 25 pounds of 3/4-inch crushed-stone chips as an armored surface. Gassert picks the hottest time of summer to do this work, because it results in a better job. In this connection, he has whipped a problem of chip raveling which has puzzled highway engineers quite often. For Gassert cannot afford to lose his armor chips . . . when the weather gets bad, planes need all the traction they can get, and propeller blasts will play havoc with all but the best seal coats.

(Continued on next page)

Save Running Time

Speed is essential if trucks are to make deliveries on time. But speed alone won't do the job. Power is also necessary to prevent delays in getting away under full loads, climbing grades, pulling out of tough spots.

Eaton 2-Speed Axles provide drivers with both speed and power. This is made possible by the two gear ratios which Eaton provides

for every conventional one. From "low low" to "high high" the Eaton driver can quickly find the most efficient gear ratio to deliver pulling power when needed, speed when desired. The result is faster running time.

And, exclusive Eaton features assure longer axle life. Your truck dealer will gladly explain Eaton's planetary gearing, positive lubrication, and other outstanding features.

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SAE 90 - 90 - 140 GEAR
LUBRICANTS
FITS ALL STANDARD 25 to 40
LB. LUG COVER PANS -
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The ideal bulk oil pump.
An on-the-job answer to
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They have solved the raveling problem at Stapleton by hours and hours of hard work with a Bros Wobble-Wheel rubber-tire roller. It is Gassert's theory that stone chips can't stick to asphalt unless they're properly bedded, so a cardinal rule on the seal-coat operation is that the rubber-tire roller must work long and steadily. Let Gassert come out and find the roller idle, and the operator hears about it in no uncertain terms. The chips are thoroughly rolled to bed them in the fresh asphalt. Then a drag broom sweeps off the excess, and the roller again works for hours to bed the remaining chips.

In the summer, when runways are warm, Gassert's men keep a Bros roller going day after day, rolling the surface of pavement which is not scheduled for resealing. It tends to keep the chips bedded, and the men believe it imparts some new life to the oxidizing surface.

In a few cases, there have been some base failures on older taxiways. When bases fail, fairly large areas are removed and the material is replaced with crushed rock or other stable material. The paved surface is then replaced by raking in hot patching material. It comes from the hot-mix plant operated by the City.

Weed Control

For many years, weed control was a problem. The airport covers some 1,721 acres of land, and until 1947 the surface was largely uncontrolled. Weeds grew rampant over much of the area, dust blew, and there was an enormous fire hazard. What would happen if a plane went out of control in the weeded No-Man's Land, and a fire started? Rescue squads couldn't even reach the plane . . .

Three years ago Gassert disposed of the weeds by controlled burning, and started to build up the ground from scratch. The drainage pattern had been nicely established, and no more grading was necessary. A contract was entered into between Denver and the Overland Trails Farm Co. to seed the entire area in winter wheat.

The wheat is sown to a point within 50 feet of each runway and taxiway. Except for about a week at harvest time, the short winter wheat presents no fire hazard. It is harvested by combines, and the stubble and straw are returned to the soil. Some of the acreage is alternated to summer fallow. Since the land was given over to agricultural use, dust has diminished almost to nil, the City realizes some profit on the harvested crop, the country benefits, and the drains are running clearer water. Gassert is even encouraging leaf trucks from the Park Department to bring their loads to Stapleton, where he can work more organic compost into the soil, either after the material has decomposed in piles, or by sheet-composting on the land surface and allowing the soil bacteria to do the digesting.

In certain areas near the administration building and traffic circles, some landscaping is also done. These plantings are made both from the standpoint of beauty and utility. But out on the airport proper, it is strictly a utility proposition, and Gassert will even argue that utility—in the case of wheat—can be beautiful indeed.

Snow Always a Problem

The No. 1 airfield maintenance problem is snow, and there is plenty of the stuff at Stapleton. It is a tribute to the maintenance staff that airline pilots have full confidence in Stapleton in the winter, because maintenance men have to work long and hard to keep the snow removed.

To complicate the problem, blizzards can end at Denver in a matter of minutes, and within a half hour the sun or stars are out and every airline under the sun wants to begin opera-

tions immediately. So snow removal has to be both effective and speedy.

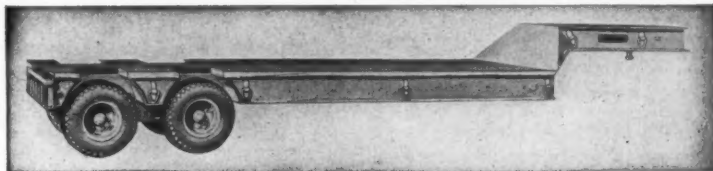
Gassert has a small Caterpillar motor grader which he uses in restricted parking areas and so on. Two large No. 12's move snow from the main parking stands, runways, and taxiways. If they need help, Gassert rents other motor graders from contractors in the neighborhood. A small Snogo rotary plow and a large-size Snogo, mounted on a 7-ton FWD, handle snow after the motor graders get it corralled into windrows.

When snowfall is particularly heavy, the motor graders work in tandem, and if it is necessary to do so, they split a windrow and work part of it over at a time. When all the snow is near the edge of the pavement, the machines make one pass to sweep the edge cut into the windrow. Then the entire windrow is picked up by a Snogo and blown over to a drainage course.

Planes can operate without difficulty even in 6 inches of snow, but Stapleton (Concluded on next page)

SOLVE YOUR HAULING PROBLEMS WITH A "TRANSPORT TRAILER"

Capacities through 75 Ton—Semi and Full Trailers



CARGO CARRIER MODEL GPX (Semi) with Tandem Axles

PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and side-wise wheel accommodation to irregularities in the road. Use of full width tubular forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

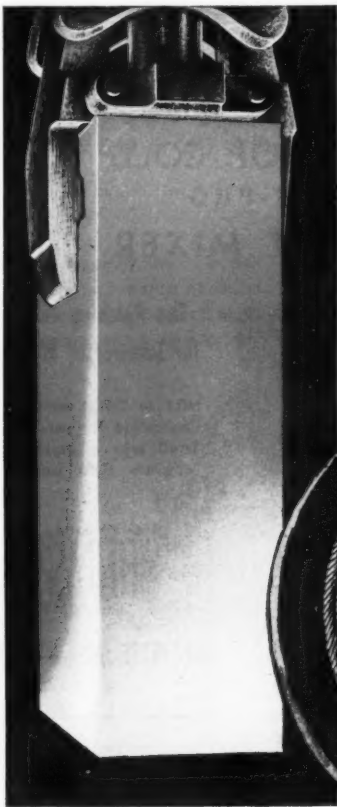
TRANSPORT TRAILERS, INC.

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Only a company like C. F. & I. with its constant checking, testing and inspection through every step of manufacture can give you the big advantages that are derived from a constant and uniform size of steel grain in each grade of finished rope wire. When you specify Wickwire Rope you're sure of wire rope that's unequalled for safe and unfailing performance . . . longer, more economical and uniform service on the job.

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Odessa (Tex.) • Philadelphia • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California



They USE Stapleton: The Mile-High Field

(Continued from preceding page)

ton's maintenance men don't let them. Snow is too much a base saturant if they let it lie. Too, if the tracks thaw and freeze, they become too dangerous. Snow is therefore removed when it falls, and the men work until they get it cleared. It has been five years since the field was closed for more than a few hours. Even during the bad winter of 1948, many of the "Operation Snow-bound" planes depended on Stapleton to stay open.

Ice is a problem as yet unsolved, because salt cannot be used. It plays havoc with aluminum rudders, wing flaps, and interior upholstery when passengers track it into the planes.

Both Davis and Gassert give high praise to the designing engineers who specified heat-retaining bituminous pavement on the taxiways and runways. They feel that this selection more than any one other factor reduced the ice problem from a potential headache to an occasional annoyance. Gassert has watched the behavior of Stapleton's paved surfaces for years now, and he finds the bituminous surfaces are the last to coat over in a blizzard, and the first to clear up when the sun comes out. He gives bituminous absorption of solar heat the credit for this performance.

Diplomats, Too

Always, as a constant sideline, Stapleton's maintenance men are public-relations men and diplomats. Every hour of the day they rub shoulders with airlines officials, pilots, hostesses, busy executives, smartly dressed women, the cream of America's traveling public. What these men do, or fail to do, is held up for comparison with other air terminals each time a DC-6 makes its run across Stapleton and turns in for its approach.

So how well does Stapleton stack up?

Measured by any standards, it stacks up fine. Stapleton has a terrific psychological advantage in any comparison, because it sits on a plain at the foot of the incredibly beautiful snow-shrouded Rockies. But it has less dust, better landscaping, smoother runways, more modern and well kept buildings, and as a good a selection of bars as you will find anywhere on America's sky-

ways. With the exception of the last item, Stapleton's maintenance men deserve the credit.

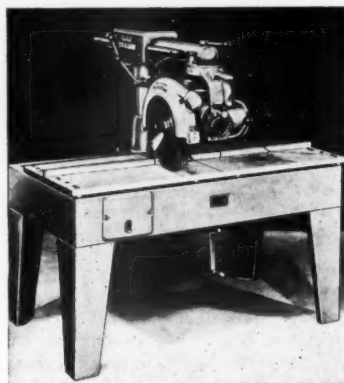
The terminal now ranks about 18th in the country from the point of air service and air volume. If future expansion goes in as planned, Stapleton will soon rank in the upper ten of the modern air terminals of the United States. For Denver's young, energetic Mayor Quigg Newton is doing everything possible to make his city grow on a solid foundation.

New Radial Saw Acts As Woodworking Shop

The Model 450 radial saw, said to be a complete woodworking shop in one unit, has been developed by Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill. It is designed to bevel, miter, rip, dado, plough, and rabbet.

Available with either manual or magnetic controls, the Skil radial saw features easy - to - reach adjustment handles which allow the operator to stay in one place and make all necessary changes and adjustments. Special stops automatically set the saw at common cutting angles.

The Skil radial saw is made in sev-



Adjustment handles are easy to reach on the new Skil radial saw. There are special automatic stops for the common cutting angles.

eral voltage, horsepower, and cycle specifications, with either 14 or 16-inch blades. It requires a floor space of 4½ x 6 feet and weighs 475 pounds. The work table is 11¼ inches deep and may be increased to 13¼ inches. The bearings can be realigned to a fraction of an inch, which is said to give constant accuracy for the life of the machine.

Further information may be se-

cured from the company. Or use the Request Card at page 16. Circle No. 249.

Foundation Structures

A new 24-page brochure on drilled and poured foundation structures has been prepared by Casey & Case Foundation Co., P. O. Box 151, Maywood, Calif. It describes in case-history fashion types and applications of foundation structures, pressure grouting, drainage, dewatering, shoring, and sub-surface soil exploration.

It includes tables to help engineers estimate drilled and poured foundation piling and caissons. These tables indicate the cubic content and skin-friction area of the Casey & Case piling and caisson shaft, and the volume of concrete required for caisson bells of different diameters in relation to various sizes of drilled shafts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 218.

STRUCTO LINE OF CONTRACTORS TOOLS

DEMOLITION TOOLS



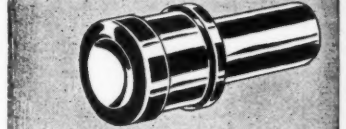
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The Patching Mixer for Summer or Winter

HOT or COLD mixtures. Unexcelled for patching. Small jobs a cinch to complete right on the job.

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EMULSIFIED ASPHALT
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This line of concrete mixers will take a lot of banging around... yet will turn out the concrete for you—faithfully and fast.

The 16-S shown is built for the big jobs where you want your equipment portable. Look at those features. They add up to the fact that this mixer will always come back for more.

The 11-S, with two or four wheels, is also available. It is easily towed, easily turned.

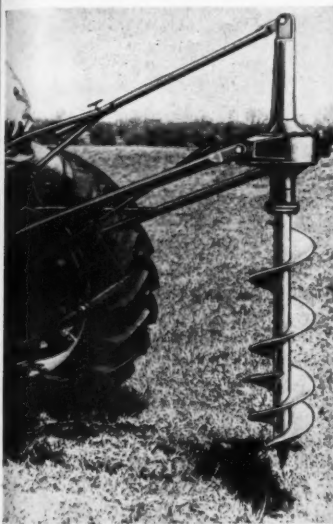
See them all at your Worthington distributor. Worthington Pump and Machinery Corporation, Construction Equipment Division, Dunellen, New Jersey.

1. Water system—exclusive spiral cut-off syphon-type—no rubber to deteriorate.
2. One-piece semi-steel drum drive gear—machined inside to true circle.
3. Skip cable winding shaft mounted in self-aligning bearings—cable is self-equalizing.
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6. Water-cooled engine. Radiator faces discharge side. Air-cooled also available.
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WORTHINGTON**



R.14



Forty inches of digging in 30 seconds is the work rate claimed for the new Twin-Draulic post-hole digger.

Post-Hole Digger Uses Tractor PTO

Digging down 40 inches in 30 seconds can save a lot of time in post-hole digging, says Twin-Draulic, Inc., Laurens, Iowa. That's the work rate claimed for the company's new one-man digger, which mounts on the rear of practically all makes of tractors, using the tractor's own hydraulic system. The rear mounting is said to give full vision and accurate spotting.

Operated from the power takeoff, the digger is hydraulically controlled by the operator in his normal sitting position. The Twin-Draulic is adjustable for digging straight or at an angle. Its replaceable hard-steel augers are available in 6, 8, and 10-inch diameters.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 217.

New Control Valves

New hydraulic control valves constructed of pressure-proof castings and hardened-steel moving parts are announced by The Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio. They are the open-center double-spool type, and are offered in 3-way, 4-way, or combination styles. Designed for heavy-duty service on construction and materials-handling machinery, the valves may be used for single cylinders or for double-acting cylinders which are not required to operate at the same time.

The valves operate at pressures up to 2,000 psi. The pressure drop through the open center of the valve is approximately 32 psi at the rated capacity of 14 gpm, though flow rates up to 20 gpm may be handled, the company says. The valves feature an externally adjustable built-in seatless relief valve, with minimum pressure rise even when by-passing oil at full pump capacity, thus preventing excessive oil temperature rise.

Any port size up to 3/4-inch pipe size may be provided. Operating handles may be mounted at either end of the valve, in an upright or inverted position. The return port may be located for direct tank mounting of the valve. A float position may be incorporated in addition to the regular raise, lower, and hold positions.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 160.

For D-A in North Texas

Jones Miller Robinson is the north Texas sales representative for D-A Lubricant Co., Inc., Indianapolis, Ind. He has just completed an intensive training program given by the company.

Supersonic Depth Recorder For Underwater Survey Work

Literature on the Model ES-123 Depth-O-Meter, a portable, precision, supersonic depth recorder for underwater surveys, is available from Bludworth Marine, 92 Gold St., New York 38, N.Y. The recorder is useful for channel dredging, survey and salvage operations, and similar work. It records depths graphically on a special coated dry paper. Recordings are in feet in three depth levels, depending on the position of the range switch. The recordings, the literature says, are of a permanent nature and will not deteriorate with age.

The circular describes the unit in detail, outlining all features and providing complete specifications. It points out that the portable unit is accurate to plus or minus 6 inches or 1 per cent of the depth, whichever is greater.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 198.

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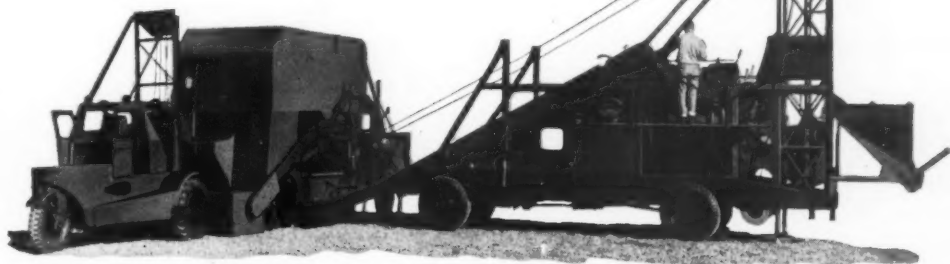
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Completely portable unit weigh batches aggregate on the job. Can be charged with front end loader from storage piles or directly from dump trucks. Single operator sets up unit for operation in 15 minutes. Weigh batches up to 50 cu. yds. per hour.

- Three 7 cu. yd. bins and 2 cu. yd. skip store up to 23 cu. yds. of aggregate.
- Charging skip hydraulically operated.
- Bin selector located by skip control directs skip.
- Equipped with either dial or beam scales.
- Weight, 17,800 lbs; height, 12 ft.; width, 8 ft.; overall length, 28 ft. (with skip down).
- Mounted all around on 8.25x20 tires.



2-YD. MIXERMOBILE • Model M-7

Completely mobile concrete mixing and elevating plant eliminates cost of hauling and erecting expensive equipment. One man handles the entire operation from mixer to deck.

- Improved batch-timer and counter insures positive mixing time.
- New electronic water meter gives unerring accuracy.
- Sturdy planetary drive hoist clutches give extra power, durability.
- Mixes up to 50 cu. yds. per hour.

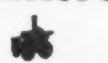


SCOOPMOBILE • Model C. The versatile Scoopmobile with exclusive planetary drive has 7 "quick change" attachments. Standard 3/4-cu. yd. scoop bucket permits operator to keep Weigh Batch unit performing to full capacity.

- Loads and transports aggregate.
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ATTACHMENTS INCLUDE: Scoop buckets in various sizes, swivel and standard type concrete hoppers in 3/4 cu. yd. capacities; lift forks, crane boom, track extensions with braces up to 26 feet overall.

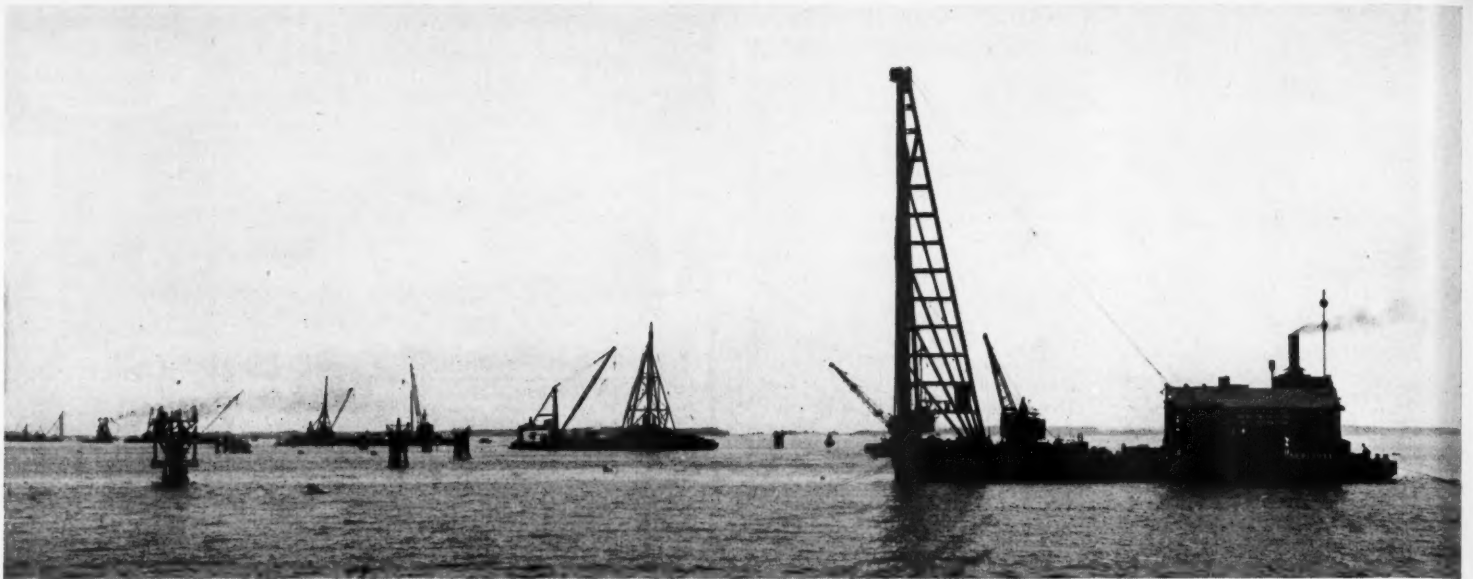
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Bay Is Bridged

By WILLIAM H. QUIRK,
Eastern Editor

**4-Mile Span, Ready in 1952,
To Cost Around \$40,000,000;
Eight Contractors Engaged on
Maryland Vehicular Crossing**

• SUCCESS comes to him who waits! After 45 years of waiting, the state of Maryland, cut in two by 170-mile-long Chesapeake Bay, will be joined in 1952 by a new bridge measuring 4.35 miles from Sandy Point near Annapolis to Kent Island on the eastern shore. As far back as 1907, efforts were made to link the mainland and peninsula by a trolley-line trestle, and later by various bridges backed by public or private interests. None succeeded in even getting started, and no backer ever attained a promise of Federal assistance or cooperation.

The Maryland State Roads Commission, handling its own financing, is building the structure with funds from a \$44,000,000 bond issue. Tolls from cars and trucks will pay back the money. J. E. Greiner Co. of Baltimore, Md., is the consulting engineer, and eight different construction firms were awarded prime contracts. Work on the project got under way late in 1949, and the span is scheduled to be completed by July 1, 1952.

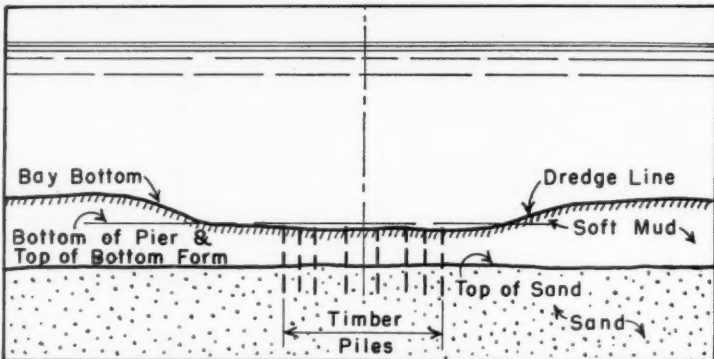
Located at one of the narrowest points in the long body of water, the Chesapeake Bay Bridge is the first span

to be built across the bay. It will replace the Sandy Point-Matapeake ferry that often becomes a bottleneck to motorists during rush periods of traffic when the normal 25-minute crossing stretches sometimes into hours. The span will also facilitate and speed up traffic on north-south coastal highways by permitting the by-passing of congested Baltimore and Washington. The markets of these big cities across the bay will then be available to farmers on the rich agricultural lands of the Del-Mar-Va peninsula, made up of the eastern shore of Maryland, Delaware, and a narrow strip of Virginia.

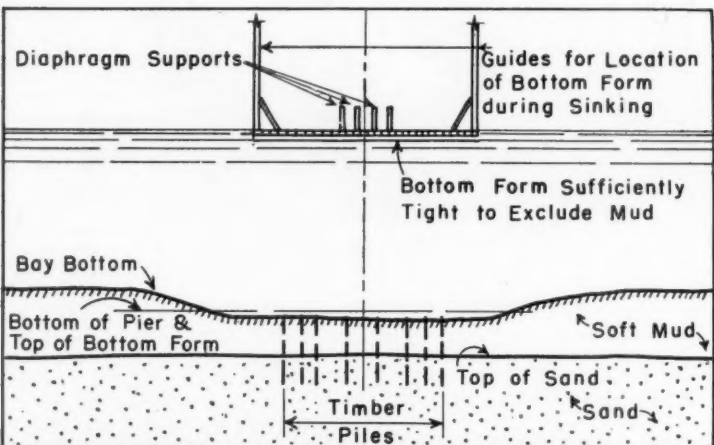
Long Bridge

Total project length exceeds 7 miles, including a ½-mile western approach, a 2¼-mile eastern approach, and the shore-to-shore length of 4.35 miles which takes in a 1,750-foot causeway from the eastern end of the bridge back to the shore line. The bridge length between abutments is 21,286 feet or 4.03 miles. This includes a 2,922.50-foot suspension section made up of two 661.25-foot side spans and a 1,600-foot center span. The latter insures a 1,500-foot horizontal clearance for the main navigation channel up the western side

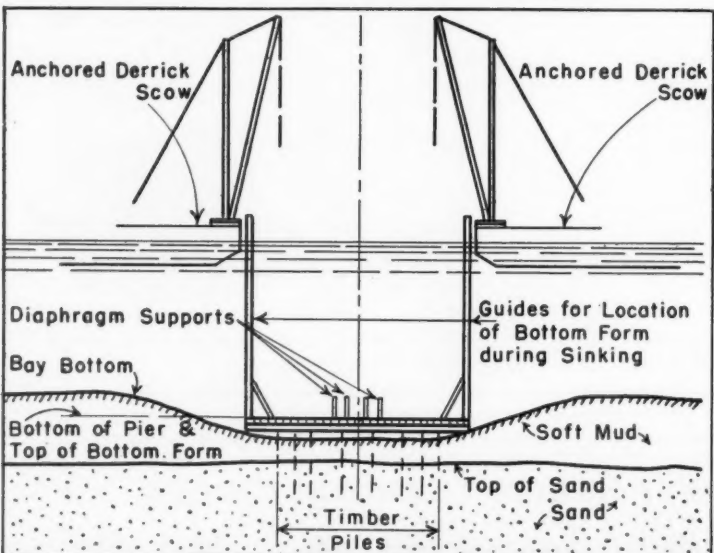
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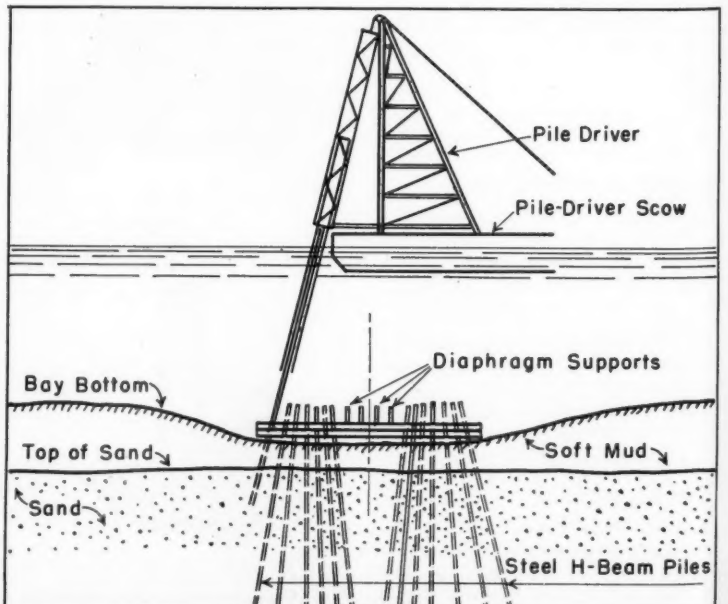
1. These drawings by J. E. Greiner Co. suggest the general method of bell-type-pier construction followed by substructure contractors on the Chesapeake Bay Bridge. In stage 1, shown here, bay-bottom silt was dredged to 3 feet below the bottom of the pier, then enough piles (of steel pipe on the Snare contract) were driven to support a bottom mat or form, the pier form, and the first pour of tremie concrete.



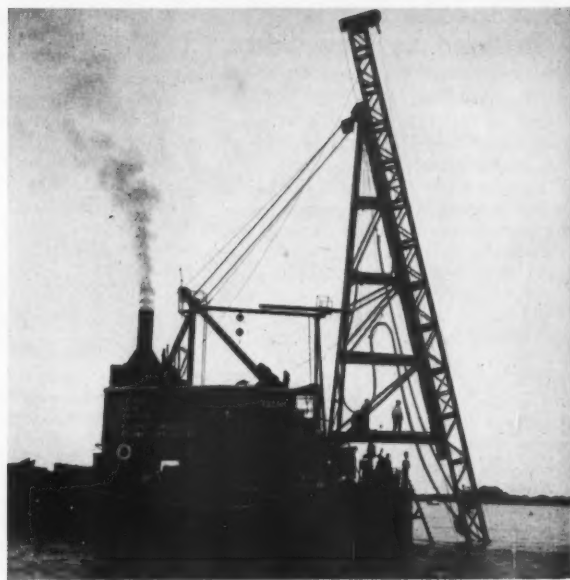
2. In stage 2, the bottom form was towed into position and located accurately.



3. Then the bottom form was sunk to rest on the piles and secured to them.



4. Next, steel foundation piles were driven through openings left in the mat.



C. & E. M. Photos

Above, far left and right, are floating rigs that drove piles for the bell-type piers of the Chesapeake Bay Bridge—Snare's No. 100 and Merritt-Chapman & Scott's Cayuga. In the middle is a closeup of the McKiernan-Terry S10 hammer used on the No. 100; the Cayuga used an S14.

For First Time

Substructures Are Bell-Bottom Caissons Resting on H-Piles Driven Through Mats Laid on The Bay Bottom

• THERE is no rock for bridge foundations in Chesapeake Bay. Beneath a soft mud and silt bottom of varying depth, sand goes down for at least 1,000 feet. Faced with such a geologic section and a maximum 90-foot depth of water, J. E. Greiner Co. of Baltimore, consulting engineer for the Chesapeake Bay Bridge, selected concrete-filled bell-bottom steel forms supported on H-piles as substructures for 28 of the 30 deep-water piers carrying the long and heavy spans of the superstructure. Because of their great size, the two anchorage piers for the suspension span did not lend themselves to this design, and are being constructed within open cofferdams (see accompanying article).

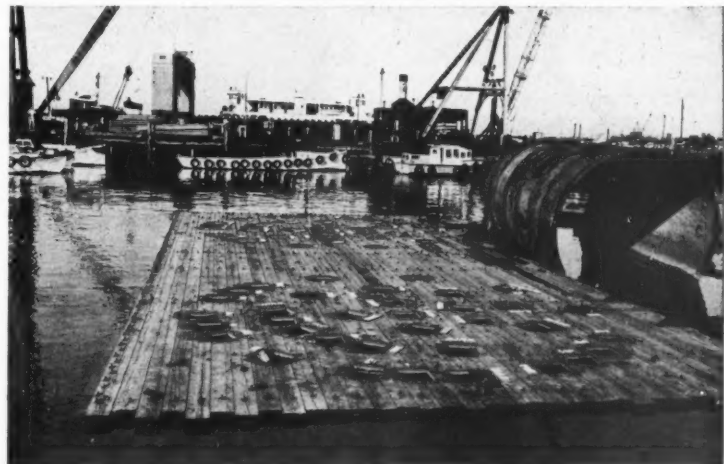
This design is known as Potomac-type piers after their use in the substructure of a bridge over the Potomac River carrying U. S. 301 from a point near Morgantown, Md., to Dahlgren, Va. J. E. Greiner Co. designed this unique type of pier for the Potomac River Bridge, the substructure of which was built by Merritt-Chapman & Scott Corp. of New York City. The same contractor is also constructing 9 similar piers on the Chesapeake Bay Bridge being built for the Maryland State Roads Commission. Two other New York contractors are building the

remainder of these piers. J. Rich Steers, Inc., has 4, and Frederick Snare Corp. has 15 such piers.

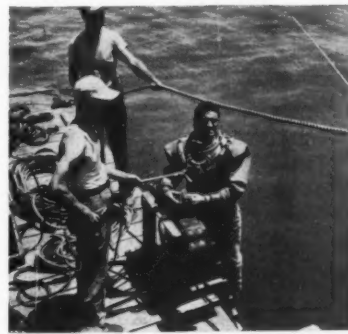
The bell-type steel forms within which tremie concrete is poured to elevation minus 8 for the concrete piers were supplied to the contractors by the State Roads Commission. The "cans," as they are termed, were fabricated by the Bethlehem Steel Co. at the Key Highway yard in Baltimore, Md., and delivered with the reinforcing steel in place. Made from 1/4-inch plate, they have either two or four cylindrical legs that are belled out at the bottom. They are strengthened with a protection plate around the outside from minus 5 to plus 5 elevation. Eight of the caissons have four legs, while the other ten have two legs.

Dimensions of the caissons vary since the piers are designed according to the loads they carry and the depth in which they are founded. Pier 27, an example of a 2-bell pier, has cylindrical legs 13 feet 6 inches in diameter on 39-foot centers. At the bottom they bell out to 35-foot diameter for the lower 10 feet. The two legs are connected by a double steel diaphragm wall 6 feet thick extending from the top of the bell section at minus 55 up to minus 10 elevation. This particular pier form is 70 feet in height, with its bottom at minus 65 and its top at plus 5 elevation. Timber forms are added to carry the pier form from plus 5 to plus 20 elevation after the steel form has been placed and filled up to minus 8 elevation with tremie

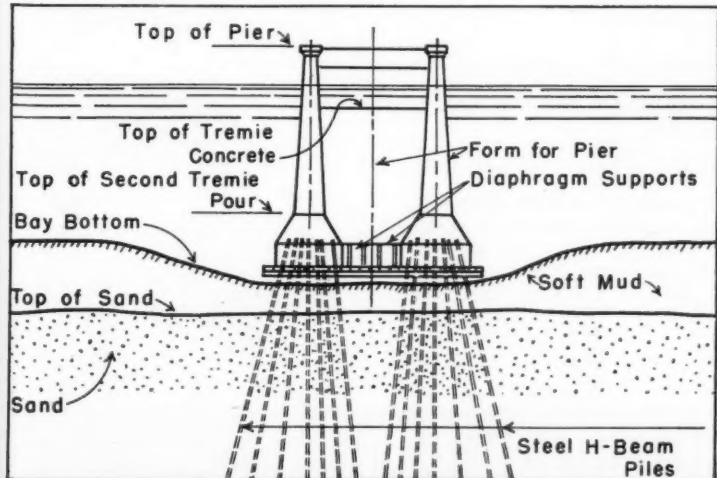
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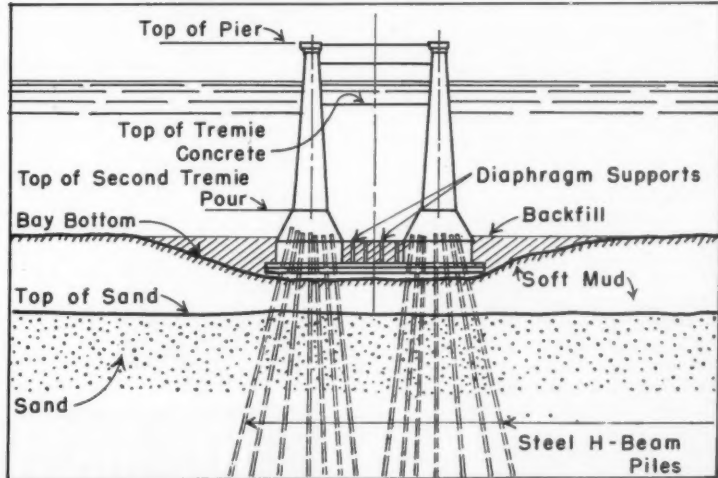
Here is one of the timber-and-steel bottom mats which support the piers. It is made up and ready for sinking (on an M-C & S contract). The openings in it are for inserting and driving the pier foundation piles.



Divers played an important role when it came to fastening the mat to the pipe piles and spotting the foundation piles which were driven through the mat.



5. Over the tops of the piles was lowered the bell-type pier form with reinforcing steel in place; openings around each pile were closed; the first tremie concrete was poured in the bell to a minimum depth of 5 feet; a second lift went in to the top of the bell; then the tremie was carried to elevation minus 8.



6. The form was unwatered to elevation minus 8 and the top of the tremie pour was cleaned off. The rest of the reinforcing steel was placed, and concrete was poured in the dry to complete the pier. The final step in the pier work was backfilling with sand up to the level of the bay bottom.

Chesapeake Bay Is Bridged by New Span

(Continued from page 44)

of Chesapeake Bay; vertical clearance at this point is 186.5 feet above mean high water. Average depth of water in this main channel is 50 feet.

Greatest depth of water in the bay is 90 feet through a natural channel near the eastern shore. This wide, deep cut is generally believed to have been the prehistoric bed of the Susquehanna River which pours into the upper end of the bay at Havre de Grace, Md. The span here includes 1,719 feet of through cantilever construction divided into lengths of 470, 779, and 470 feet. The rest of the bridge is made up of deck cantilever construction over the longer spans, deck truss spans, deck girder spans, and beam spans.

After leaving the west abutment, the bridge alignment is tangent for 3,200 feet when it swings into a 1-degree 40-minute curve to the left for 2,870 feet. Then it straightens out for the remainder of the distance to the eastern abutment, crossing the navigation channels at right angles. The slight curve in the alignment permitted the bridge designers to hold the span to a minimum length, and provided the best possible locations for the two bridge-heads.

The superstructure will support a 28-foot concrete roadway designed to carry 1,500 vehicles per hour in each direction, or a total annual traffic of 8,500,000 vehicles. Estimated annual traffic in the first year of operation is put at 1,100,000 vehicles; by 1961 this figure is expected to increase to 1,550,000. Average time of shore-to-shore crossing is 5¼ minutes. The maximum height of the roadway above the water is 198.5 feet reached by a maximum 3 per cent grade at the western end of the suspension span. Aerial beacons on the suspension-span towers are 354 feet above the water. Maximum depth of foundation piling below the water is 203 feet. This occurs in substructures at the east channel where steel H-piles 135 feet in length were required.

Into Many Contracts

For speed of construction and economy, the big project was split up into several contracts. Beginning at the west end, Booth & Flinn Co. of Pittsburgh, Pa., has a \$495,566 contract for the construction of the west abutment and bents 1 to 29 inclusive, which will carry thirty 60-foot beam spans. Four of the 29 bents are 12-pile bents; the remainder are 6-pile bents. The 6-pile bents consist of 16-inch cast-in-place Monotube foundation piles, topped by a concrete cap to support the simple steel spans. This contract (10-4-87) was handled by land equipment operating off a timber work trestle. It got under way in January, 1950, and was completed by December.

Adjoining to the east is the first (10-6-87) of three contracts awarded to Merritt-Chapman & Scott Corp. of New York City. This contract takes in piers 1 through 10 which support three 200-foot deck girders and seven 100-foot deck girder spans. These are rigid-frame concrete piers, with a concrete diaphragm from elevation plus 10 to the distribution block which is supported on steel H-piles, and built within open steel-sheet-pile cofferdams. Work on this \$567,253 contract started in February, 1950, and was finished in November.

Piers 11 through 22 were awarded to the Frederick Snare Corp. of New York City on a low-bid contract (10-2-87, Alt. 1) of \$2,511,664 which also included the building of piers 29, 30, and 31 on the east side of the suspension span. The previously mentioned curve on the bridge starts at pier 11 and ends at pier 21. Piers 11 through 22 support four 250-foot deck truss spans, six 300-

foot deck truss spans, one 480-foot cantilever span, and one 452-foot span of deck cantilever construction. On the other side of the channel, piers 29, 30, and 31 support deck cantilever construction of 600 and 480-foot spans. All these piers are the bell-bottom caisson type, either two or four cylindrical legs connected by diaphragms, supported on steel H-piles driven through openings in a mat form laid on the bottom of the bay. (See accompanying article, page 45.) The Snare job started in January, 1950, and it was finished in March, 1951.

More M-C&S Work

Merritt-Chapman & Scott Corp. picked up again on the eastern side of the main channel with a \$3,060,116 contract (10-3-87, Alt. 1) for the construction of piers 32 through 40. These are also bell-bottom caisson-type piers supporting deck cantilever spans of 480, 600, 480, and 452½ feet; spans of through cantilever construction 470, 779, (Continued on next page)

MEET LOMBARD'S "NEW BABY" the "WOODLOT WIZARD" Amazing New 16" Lite-weight Chain Saw A true LIMBING & TRIMMING "WIZARD"

Also 4-hp and 7-hp Chain Saws in sizes from 19" to 72". LOMBARD GOVERNOR CORP., Ashland, Mass. Dealer Opportunity.

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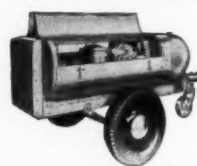


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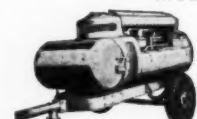
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and 470 feet over the eastern channel; and a single 200-foot deck girder span. Work over this stretch of the bay began in April, 1950, and is expected to be completed some time this summer.

Continuing eastward is the third M-C&S contract (10-7-87) for \$915,475, covering the building of piers 41 through 57 as foundation for a superstructure of three 200-foot deck girder spans and fourteen 100-foot deck girder spans. Their construction is similar to piers 1 through 10—concrete on H-piles, built within open cofferdams. Work started in March, 1950, and was finished by the end of the year.

Adjoining the M-C&S work to the east is a \$544,010 contract (10-5-87 Alt. 2) for the construction of 36 bents and the east abutment. This portion of the project was awarded to Baltimore Contractors, Inc., of Baltimore, Md., which started operations in April, 1950, and finished in January, 1951. Superstructure over this contract consists of beam spans—35 at 61.5 feet, one at 60.7 feet, and the last span to the east abutment at 59 feet. Piles supporting the bents are 14BP73, either 6 or 8 to a bent, that serve as a foundation for a block of concrete whose top is just above the surface of the water. Above this block is a concrete frame made up of two columns and a cap on which the steel beams are laid for the superstructure. This work was done with floating equipment.

Inland from the east abutment to the shore line is a 1,750-foot causeway averaging 20 feet in height. This embankment was built by C. J. Langenfelder & Son, Inc., of Baltimore, Md., under a \$354,393 contract. Work started in November, 1949, and was completed by June, 1950. The fill was end-dumped out from shore within stone riprap that extended up the side slopes from the bay bottom to plus 3 elevation. The maximum depth of water was only 4 feet.

More Frederick Snare Work

In addition to the 15-pier contract previously mentioned, the Frederick Snare Corp. was also awarded a \$4,205,110 contract (10-9-87 Alt. 5) for the construction of the two anchorage piers, 23 and 28, for the suspension span. They are scheduled for completion in August, 1951. These piers are large; at the bottom each is 149 feet, measured along the bridge center line, x 78 feet across. Each is supported on six hundred 14-inch 102-pound steel H-piles. The piers are being constructed inside steel-sheet-pile cofferdams.

Before any piles were driven, the soft silt on the bay bottom was removed down to a stratum of firm sand. This excavation was then backfilled with



C. & E. M. Phot.

Arundel Corp.'s dredge State of Maryland, a 14-yard clamshell, works at pier 26 for J. Rich Steers, Inc., one of the contractors on the Chesapeake Bridge project.

sand through which the piles were driven. At pier 23 the mud and silt removed averaged 20 feet in depth from the bottom of the bay at minus 44 elevation to the sand line at minus 64. Frederick Snare Corp. sublet the

dredging work on its contract to the Arundel Corp. of Baltimore, Md.

In deeper water at pier 28 an average of 58 feet of mud and silt was taken out from bay bottom, elevation minus 57, down to firm sand in some places to

minus 125. The depth of this cut with its flat sideslopes extended the hole back as far as pier 27. Bottom-dump scows backfilled the excavations with sand up to the level of the bay bottom, under a subcontract to Great Lakes Dredge & Dock Co. of New York City. Then floating rigs drove the sheeting for the steel cofferdams.

Heavy Cofferdams

Cofferdams for the two anchorage piers measure 150 feet 1½ inches x 78 feet 1 inch. The cofferdam for pier 23 was built first, but both feature the same heavy-type construction. Around the perimeter on 6-foot centers are master piles, 36-inch WF 170-pound beams 75 feet long, with their tops at plus 7 elevation and bottoms at minus 67.1 minimum depth. The master pile in each corner of the cofferdam is a steel girder 5 feet deep x 75 feet long and weighing 18½ tons. The master piles are backed up every fourth pile with batter piles.

(Continued on next page)

Tournadozer on TIMKEN® bearings moves 94.5 yards an hour on 321-foot push

WHEN 105,000 tons of gravel were needed for highway construction near Orem, Utah, the big problem was moving gravel from pit to mix plant fast enough for steady output. The problem was solved when a Timken® bearing equipped Super C Tournadozer was put on the job. It moved 94.5 yards of gravel an hour on a 321-foot, 1-way push from pit to plant!

Built by R. G. LeTourneau, Inc., the high-speed Tournadozer uses 25 Timken tapered roller bearings to insure fast operation, long life and trouble-free performance. Timken bearings in the transmission keep gears and shafts in alignment, reduce

wear, assure a smooth flow of power. And because they're mounted on Timken bearings, the dozer blade control and scraper attachment gear boxes take the heavy loads easily. Maintenance and lubrication are reduced.

Tapered construction enables Timken bearings to take any combination of radial and thrust loads. Line contact between rollers and races gives extra load-carrying capacity. True rolling motion plus an incredibly smooth surface finish makes friction negligible. And tight, lubricant-retaining closures keep out damaging dirt and moisture, keep the lubricant in.

Timken bearings are made of the finest steel ever developed for tapered

roller bearings—Timken fine alloy steel, are engineered for the job and precision manufactured—three reasons why Timken bearings normally last the life of the machine.

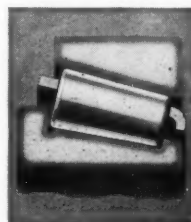
No other bearing can give you all the advantages you get with Timken bearings. That's why bearings with the trade-mark "Timken" are industry's No. 1 choice. Insist on them when you buy. Specify them when you build. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best.



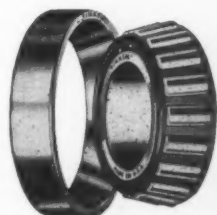
R. G. LETOURNEAU, INC., mounts the transmission of its Super C Tournadozer on 12 Timken bearings to insure trouble-free, dependable performance. 13 other Timken bearings are used throughout this high-speed dozer.



GREATER LOAD AREA

Because the load is carried on the line of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

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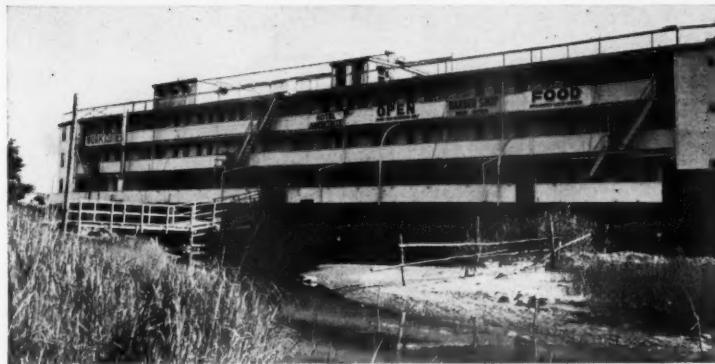
Chesapeake Bay Is Bridged by New Span

(Continued from preceding page)

Before these master piles were driven, MP-112 sheet-pile sections of the same length were split down the middle, and the half pieces were welded to each side of the outer flange of the master piles. The composite section was then driven as one unit with a McKiernan-Terry S10 hammer. Between these master-pile sections are panels made up of three MP-112 sheet piles that were driven on an arc curving inward with a 7-foot 7-inch radius. The separate sheeting was driven with a McKiernan-Terry 10-B-2 hammer.

In cofferdam 28 which is deeper, the master piles are 36-inch beams weighing 300 pounds per foot and the corner piles weigh 30 tons.

The wale ring at the top of the cofferdam is a 27-inch WF 102-pound beam framed against the inner flange of the master piles. Cross-bracing consists of



C. & E. M. Photo

Living quarters for bridge crews were a problem. To solve it, the floating Hotel Amphitrite was moved up the coast from Georgetown, S. C., and floated to an inlet near the bridgehead.

either 12-inch WF 72-pound or 10-inch WF 54-pound struts that serve as spreaders between the opposite sides. They are supported on 12-inch 53-pound steel H-piles. These pin or bearing piles are laid out in three rows of

seven piles each, and at the top are welded to the cross struts. With this heavy horizontal framing at the top of the cofferdam, and the piles driven firmly into the bottom sand, the need for intermediate wales was eliminated.

Driving Piles From on Top

Over the tops of the master piles, down the two long sides of the cofferdams, 21-inch WF 102-pound beams were placed for the support of 100-pound rail sections. The rails carried a rolling bridge on which a Wiley Whirley was set up to drive all the foundation piles in the pier. These six hundred 14-inch 102-pound steel bearing piles, most of them battered, were driven to 130-ton bearing with an S10 hammer. Their tops are at minus 34 elevation and their bottoms at minus 101, with at least a 30-foot penetration into the original sand stratum of the bay bottom.

The cofferdam for pier 23 was excavated down to minus 52, but the piles were driven through the water. The tremie seal in this pier is 17 feet thick, from minus 35 to minus 52. Pier 28 has a 20-foot tremie pour, from minus 44 to minus 64. Above the tremie seals, all concrete is poured in the dry. Immediately over the tremie concrete is a solid 5-foot block on a slight setback. The rest of the anchorage piers are built in cells, with the main portions going up to plus 20, and the rear columns up to plus 90 or higher.

The steel for both the cofferdam construction and the bearing piles came from Bethlehem Steel Co., most of it being supplied from the Sparrows Point plant in Maryland. Master-pile driving for the cofferdam was done mainly with rig 96, a steel barge, 40 x 100 feet, mounting a 120 Wiley Whirley equipped with a 110-foot boom. Most of the steel assembling was handled by rig 41, a 15-ton steel-hull derrick boat with an 85-foot boom off its A-frame.

Sand Islands

To protect the two anchorage piers against ships running into them and damaging the suspension cables, a buffer of sand was built up around their perimeter. During the work on the cofferdams the sand was backfilled up to minus 35, and extended out beyond the sheeting on a 12-foot bench. A separate \$1,878,750 contract (10-11-87 Scheme B) was awarded to Construction Aggregates Corp. of New York City to construct sand islands at these piers to a height of 10 feet above the level of the bay. They extend about 220 feet from the back of the anchorage piers in the direction of the channel, and are 150 feet wide.

Work on the islands did not start until the concrete in the piers was up above the level of the water. Riprap was first placed around the toe of slope, and sand was dumped within on 2 to 1 slopes. The riprap continues up the sides, and the upper 2 feet of the islands consists of a gravel blanket.

Tower Piers

The four remaining substructure piers—24, 25, 26, and 27—went to J. Rich Steers, Inc., of New York City on a low-bid contract (10-9-87 Alt. 2) of \$3,023,685. They are at the suspension (Continued on next page)

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portion of the bridge, supporting the 661, 1,600, and 661-foot spans. Piers 24 and 27, the side piers, are 2-bell caisson type, while the main tower piers, 25 and 26, are 4-bell caisson design. All are supported on steel H-piles. Work on these piers began in March, 1950, and was finished in November.

Substructure units in the bridge project total up to 124, including 65 bents, 57 piers, and 2 abutments. Of the 57 piers, Merritt-Chapman & Scott Corp. have the majority with 36, including the deepest structures. The Frederick Snare Corp. contracts for the 2 anchor piers and 15 bell-bottom caisson-type piers involves the most money for any one substructure contractor, with bids totalling \$6,698,854.

The largest single contract on the

project is the \$15,953,150 job that was awarded to the Bethlehem Steel Co. of Bethlehem, Pa., for the entire superstructure. Steel erection was expected to get under way the end of 1950 or early in 1951. The 2-lane reinforced-concrete deck, 28 feet wide, will be paved by the Kaufmann Construction Co. of Philadelphia, Pa., under a subcontract. The roadway width will accommodate disabled cars without interference to opposing streams of traffic.

Equipment and Materials

A vast fleet of floating equipment was concentrated at the 4-mile bridge project, strung out from shore to shore as work progressed simultaneously on all contracts. Besides the main con-

tracts touched on here, other contracts will cover such miscellaneous work as approach paving, bridge lighting, and the construction of an administration building. In addition to the prime contractors mentioned, The Arundel Corp. of Baltimore had some of its floating equipment at the site on a dredging subcontract for J. Rich Steers, Inc. The bulk of this digging was handled by the 14-yard clamshell dredge State of Maryland.

The workers on the various contracts averaged around 750, and it has been estimated that 6,500,000 man-hours of labor will be required at the site. As an aid in providing living quarters for the bridge crews, the floating Hotel Amphitrite was moved up the coast from Georgetown, S. C., and floated into an

inlet on the western shore near the bridgehead.

Some of the major materials going into the bridge include:

Concrete	118,000 cu. yds.
Reinforcing steel	6,000 tons
Permanent steel forms	3,000 tons
Piling, steel	17,500 tons
Miscellaneous steel	2,000 tons
Structural steel	30,000 tons
Steel cable	1,500 tons

The concrete will require 75,000 tons of sand, 125,000 tons of gravel, and 210,000 barrels of cement. The 1,500 tons of steel cable will account for 485,000 linear feet of main suspension-cable strand, and 240,000 linear feet of suspender-cable strand which will extend from the main cable to the bridge deck.

(Concluded on next page)

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Chesapeake Bay Is Bridged by New Span

(Continued from preceding page)

Personnel

Key personnel on the project include R. M. Hand, Project Manager for Merritt-Chapman & Scott Corp.; Dick Tower, Superintendent for J. Rich Steers, Inc.; E. C. Lampman, General Superintendent for Frederick Snare Corp.; with Walter Caccia, Superintendent on the two anchorage piers; Artie Goodale, Assistant General Superintendent; Thomas Hayes, Chief Project Engineer; and Bob Redlien, Engineer on pile driving.

For the J. E. Greiner Co., Consulting Engineer, Bruce Herman is Resident Engineer.

The Maryland State Roads Commission is headed by Robert M. Reindollar, Chairman, with W. F. Childs, Jr., the Chief Engineer.

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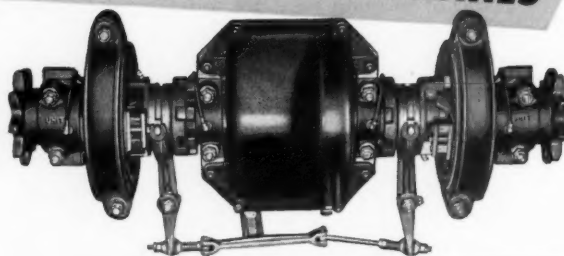
The yoke can be lowered within the frame, placing the drill in the lowest desired position for toe-hole work. For higher holes, a hoisting mechanism

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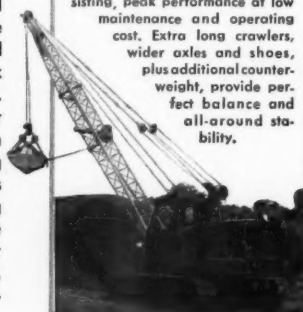
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A new service bulletin, "Protective Maintenance Increases Profits", has been issued by Cummins Engine Co., Inc., Columbus, Ind. Although this guide does not fit every operation, it does give the operator a basic protective-maintenance program which can be changed as the experience of the owner dictates. The company points out that protective maintenance involves more than lubrication and fueling operations. It also calls for periodic wear checks and rebuilding of various component units.

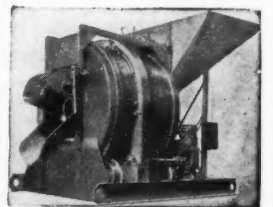
One of the chief benefits of a comprehensive maintenance program is the reduction of engine down-time, the literature says. Cummins points out that unscheduled repairs, usually occurring just when the equipment is needed, are most expensive.

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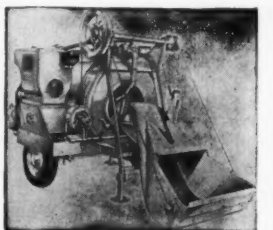
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CONSTRUCTION MACHINERY COMPANIES
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Bell-Bottom Caissons Used for Bay Bridge

(Continued from page 45)

concrete. Piers 36 and 37 are the deepest, with their bottoms at approximately minus 98.

Constructing a Pier

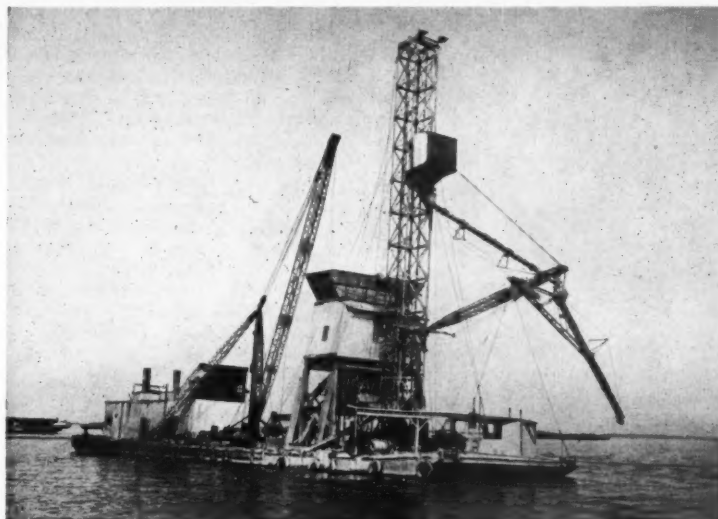
All three contractors followed a fairly similar plan of operations in constructing a bell-type pier. The methods of the Frederick Snare Corp. held to the following general pattern. First, the soft mud at the pier site was removed by dredging to a depth of 13 feet below the bay bottom, which came to about 3 feet below the designed bottom elevation of the pier. Then 14-inch O D steel-pipe piles, from 25 to 50 feet long, were driven to 30-ton bearing to support the bottom mat or form, the steel cans, and the first pour of tremie concrete. Usually eight pipe piles sufficed for a 2-bell pier and sixteen for a 4-bell pier, but as many as 40 have been driven at one pier site.

Driving was done with floating rig No. 100—a steel barge on which is mounted a 124 Wiley Whirley equipped with 106-foot telescoping steel leads and a McKiernan-Terry S10 hammer. Divers cut off the piles to the proper grade, and then fastened across their tops grillage beams that were lowered into the water. Inserts had been welded to these 12-inch H-beams which slipped easily into the pipe piles. Bolted connections held the framework together in a sturdy assembly to support the bottom mat form.

This laminated timber and steel mat or platform had been made up on shore, with openings left in its flat surface for inserting and driving the steel foundation piles for the pier. The openings were framed with steel plate, and each clearly marked with raised Roman numerals painted white to aid the diver in steering the bearing piles into the right aperture. Sight towers were erected up from the platform deck to extend above the surface of the water during the sinking operation. One such light tower sufficed for a 2-bell platform, while two were erected for the larger 4-bell form mat.

Form and Template

A pair of derrick boats lowered the mat into position, the light towers serving as a guide for line and distance. Controls were established throughout the sinking from survey platforms strung out across the bay paralleling the bridge piers. Divers bolted the mat to the steel grillage on top of the pipe piles, then cut away the light towers which were no longer needed. The mat or platform was then ready to serve



C. & E. M. Photo

Pier concreting on M-S & C contracts was done with two floating plants. This one is No. 8, which has two Hansome mixers and an 80-foot hoist tower.

its purpose as both a bottom form for the pier, and a template for driving the steel foundation piles to 130-ton bearing, with a minimum 25-foot penetration into the sand stratum.

From 24 to 104 piles were driven for a pier. They were Bethlehem 14-inch 102-pound H-piles, the longest being 80 feet. They were driven with rig 100 using the S10 underwater hammer. First a plumb pile was driven to spud the platform in place, followed by the rest, either plumb or on 1 to 4 or 1 to 6 batters. Great precision was required in setting these piles, as the 14-inch H-sections had to slide through a template opening of only 16 inches. Transits on survey platforms gave the line, steel tapes from these control points established the distance, and a Sperry gyrocompass on the driving rig checked the angle in relation to the center line of bridge to which the batter pile was to be driven.

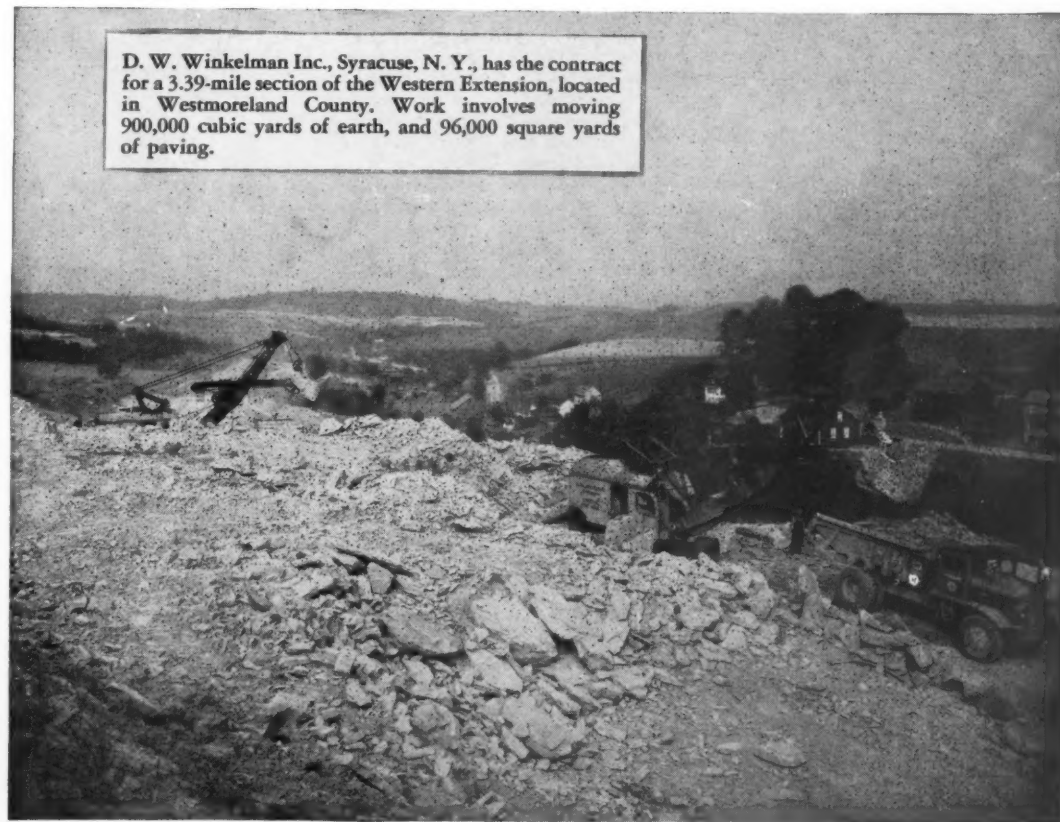
Final adjustments, however, came from the diver deep in the water who

(Concluded on next page)

GULF PRODUCTS and FINE SERVICE

*keep equipment rolling on Western Extension
of the Pennsylvania Turnpike*

D. W. Winkelman Inc., Syracuse, N. Y., has the contract for a 3.39-mile section of the Western Extension, located in Westmoreland County. Work involves moving 900,000 cubic yards of earth, and 96,000 square yards of paving.

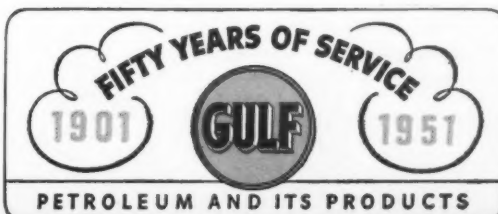


THE Western Extension of the Pennsylvania Turnpike is another big and important project where the majority of contractors rely on Gulf to help keep equipment delivering top performance.

Leading contractors, like D. W. Winkelman, Inc. for example, know from experience that Gulf quality lubricants provide an extra margin of protection against mechanical delays. And that Gulf fuels insure full engine power and efficiency.

Then, too, they appreciate the engineering counsel Gulf provides to assure the most suitable lubricants and fuels for every unit and operating condition. And Gulf's prompt delivery service is also important to them.

Let us discuss with you how Gulf products and services can help you on your next job. They are available to you through more than 1200 conveniently located warehouses. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh, Pennsylvania.



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For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.
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QUINN CONCRETE PIPE MACHINES
QUINN WIRE & IRON WORKS 445-11th BOONE IA

Bell-Bottom Caissons Used for Bay Bridge

(Continued from preceding page)

guided the tip of the long steel pile into the proper opening. The heavy underwater hammer averaged 55 blows per minute in its driving routine. After the piles were driven, divers again went down and cut them off to grade when necessary, which usually was 10 to 15 feet above the top of the mat.

Concrete Work

Over the tops of the piles the bell-type caisson was next lowered into position from derrick barges. This was also a tight fit since there is only a 10-inch clearance between the edge of pile and the reinforcing steel inside the form. The smaller 2-bell cans were lowered in one piece, but the larger 2 and 4-bell cans came in several pieces that were bolted together under water by the divers. The openings around the piles at the holes in the mat form were

blocked off with steel plates, and the pier was ready for the first pour of concrete tremie seal.

Concreting was done from a floating plant, rig 99, a barge on which were set up two Koehring 2-yard mixers with a capacity of 80 yards an hour. The first tremie concrete was to a minimum depth of 5 feet. The top of this lift was cleaned off and more tremie concrete was placed until the minus 8 mark was reached in the forms. Then the bells were dewatered and concrete placed in the dry to the top of the permanent steel forms at plus 5. From plus 5 to the tops of the piers, both wood and steel forms were used; two lifts were made, one to plus 10 and a second to plus 20, this lift including a diaphragm between the bells of the piers. Above that elevation the steel tower bents supporting the spans are erected under the superstructure contract. Final step in the pier work is backfilling with sand up to the level of the bay bottom.

For its share of the project, Frederick Snare Corp. assembled an imposing fleet of floating equipment including four Wiley Whirlies—Models 75, 85, 120, and 124—on steel barges; a 15-ton derrick boat; a 35-ton derrick boat; a 65-ton derrick boat; 9 scows; water barge; fuel barge; 3 pontoon barges; 10 boats including launches, work craft, and tugs up to 450 hp in size.

Merritt-Chapman & Scott Corp.

On its nine bell-type caisson piers, Merritt-Chapman & Scott Corp. followed pretty much the same construction procedure. Timber piles, however, were used instead of steel-pipe piles in supporting the bottom mat form. This contract included the deepest piers on the project, and involved driving steel bearing piles in 98 feet of water. For this work M-C&S employed its floating driver Cayuga—a Wiley Whirley on a barge equipped with 114-foot telescoping steel leads and a McKiernan-Terry S14 hammer. Leads and hammer alone weigh 52 tons. The 16-ton hammer with a 7-ton ram strikes a blow of 37,500 foot-pounds.

Timber-pile driving was done with rig 21, a floating driver equipped with 109-foot underwater leads and 75 and 40-foot extensions. Concreting was handled by rig No. 8, a floating plant with two Ransome 1-yard mixers and an 80-foot hoist tower, having a capacity of 60 cubic yards an hour—also by

rig No. 1 with two 2-cubic-yard mixers having a capacity of 100 cubic yards an hour. Floating equipment included 60 pieces, with 12 derrick boats ranging in size from 15 to 100 tons being the most impressive, along with the pile drivers and concrete plants. Six tugs furnished motive power to the fleet.

As on most big water jobs, the elements were always the toughest problem. The long open bay was wind-swept a good deal of the time, the water was rough, and the currents swift. Fog and mists often closed in, making contact with the many piers tricky and hazardous. Storms came up fast, sometimes with little or no warning. However, the work is going along pretty close to schedule at this stage of the project.

Personnel

For Merritt-Chapman & Scott, R. M. Hand is Project Manager. E. C. Lampman is General Superintendent for

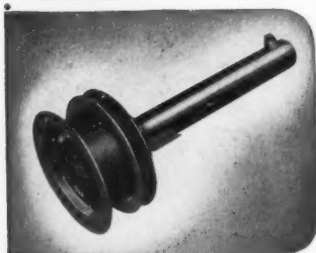
Frederick Snare Corp. J. E. Greiner Co., Consulting Engineer, is represented by Bruce Herman, Resident Engineer.

For Metal Fabrication And Lighting Assemblies

An informative 4-page folder which describes facilities for fabricating metal and assembling electrical components is offered by A. L. Smith Iron Co., Smithcraft Lighting Division, 233 Everett Ave., Chelsea 50, Mass. It shows how the organization is currently set up to produce a wide range of fabricated products, with or without electrical wiring, as either prime or subcontractor. It describes the products made by the company, the design and layout of its plants, and the tools and equipment used in this work.

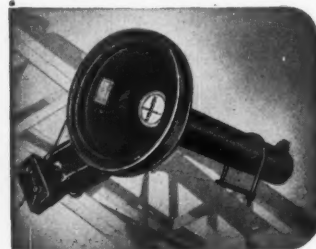
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 151.

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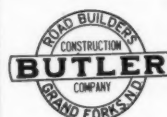
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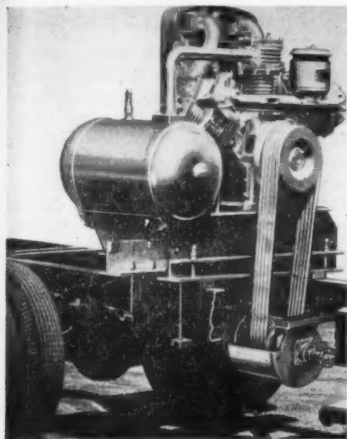


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Jaeger's Model 125 compressor is now available for truck mounting and truck-engine drive.

Truck Engine Powers New Air Compressor

A truck-engine-powered compressor for driving pavement breakers, clay spades, backfill tampers, etc., which require 100-pound air has been introduced by Jaeger Machine Co., 701 Dublin Ave., Columbus 16, Ohio. It mounts on any of five makes of 1½ and 2-ton rated trucks, adapts to special body designs, and derives power from the truck engine through a simple power takeoff.

First costs are said to be low because there is no compressor engine and engine cooling system to buy; no engine-to-compressor clutch, trailer unit, fuel tank, battery, or towing hitch, as on trailer-type units. Maintenance is said to be reduced proportionately. And an engine is used which otherwise often stands idle.

The compressor is Jaeger's New Standard model, furnishing 125 cfm of 100-pound air. It can drive two heavy-duty or three medium-duty pavement breakers at full 90-pound pressure at the tools, the company says. The power-takeoff unit takes the place of a part of the truck's driveshaft, contains no gears, and has a simple solid-shaft-type clutch for directing power to the compressor through V-belts, or to the truck's rear wheels. Two levers in the truck cab control all functions. During compressor operation, truck engine speed is automatically regulated for idling (unloading) and compressing. Compressing speed is 1,750 rpm (approximately 24 mph on the speedometer).

Information on installation, operation, and control may be obtained from the company by requesting Bulletin TC-1. Or use the Request Card at page 16. Circle No. 165.

Decimal Conversion On Measuring Tapes

A decimal-equivalent chart, giving the conversion of 64 fractions into decimals, is now printed on the back of the measuring tapes made by Master Rule Mfg. Co., Inc., 40 Mulberry St., Middletown, N. Y. A glance at the chart translates a measurement reading in fractions of an inch into decimal figures.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 158.

Aggregate Equipment Co.

Lightweight Aggregate Equipment Co., a new firm which will produce lightweight-aggregate plants for the building industry, has been organized by Marietta Concrete Corp., Marietta, Ohio, and Besser Mfg. Co., Alpena, Mich. It will furnish plants from its own designs for large-scale production of Beslite.

The officers of the new company are

F. L. Christy, President and a director; J. H. Besser, a director; Elroy C. Bobolts, Vice President, a director, and General Manager; Marx P. Rosenthaler, Treasurer; and R. Neil Christy, Secretary and a director. The company's executive and sales offices are in the First National Bank Building, Marietta, Ohio.

Weekly Woodworking Data

A weekly woodworking information sheet is presently being offered by DeWalt Inc., P. O. Box 540, Lancaster, Pa. It discusses woodworking problems, techniques, and methods, and its information is based on results obtained from problems presented to the DeWalt Test Department. Ripping short stock, chamfering, and gang cutting were subjects recently discussed in "Saw Tips".

To obtain free copies of this literature, write to DeWalt Inc. Or use the Request Card at page 16. Circle No. 154.

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No Flexible Shaft

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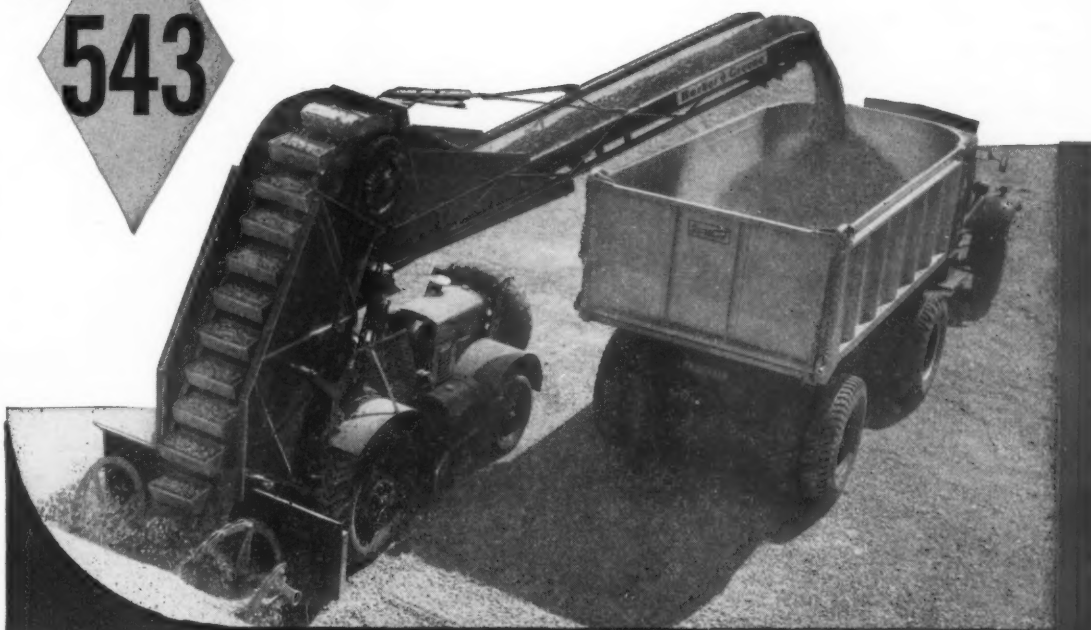
154 DISTL AVE., MANSFIELD, OHIO



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MODEL
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SAVES LOADS

man power-truck time-money

all free-flowing materials
at 3 yds. per minute

Cost studies prove that nothing can compete with a Bucket Loader in lowest cost loading from stock piles to trucks.

The B-G constant flow principle virtually eliminates the human element — guarantees the same hourly production all day long, whether the operator is fresh or tired out.

The new Barber-Greene Model 543 is the last word in loading economy. Backed by over a billion cubic yards handled by its predecessors, this machine is ready to cut your loading costs.

The new hydraulically controlled trimmer-conveyor combines with time-proved B-G advantages — such as the Spiral Feed, Cleanup Scraper, automatic Overload Release and Floating Boom — to save appreciable manpower on every job. With its 15 m.p.h. road speed, the 543 can get to the job fast and move from pile to pile in a hurry. It is built for high production through years of low-cost service. In addition, it is convertible to a Snow Loader for year-round usefulness.



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PERMANENT CONVEYORS



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The latest improvement on the Kal-Truk concrete buggy is a control door on the front which allows easier pouring into small or narrow openings.

New Dump Control For Concrete Buggy

A new dump control for the front endgate of the Kal-Truk, designed to permit easier pouring in small or narrow openings and easier discharging of partial loads, is announced by Kalamazoo Mfg. Co., Kalamazoo 24, Mich. The dump control is manually operated and may be opened or closed at any time, the company says. A front endgate embodying this new feature can be furnished for installation on trucks already in service.

The Kal-Truk is powered by a 13-hp 2-cylinder engine and has a capacity of $\frac{3}{4}$ cubic yard or 3,000 pounds. The body is suitable for handling concrete, loose aggregates, stone, and other construction materials.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 216.

Data on 29 Basic Trailers

A new illustrated 52-page catalog on 29 basic trailer models is offered by Fruehauf Trailer Co., 10940 Harper Ave., Detroit 32, Mich. It details the Multi-Rate single axle and the Gravity-Tandem suspensions and underconstructions. The latter are available for 16,000, 20,000, 25,000, 36,000, and 40,000-pound axle loads.

Specifications and features are given on the full line. Units of interest to construction men include 4-wheel platforms; four carry-all models, including level-deck and double-drop semi and full trailers; gasoline tankers; dumps; bulk-cement trailers; three trailer chassis; and two pole trailers.

The catalog outlines the merits and uses of six types of trailer landing gear, and suggests the most suitable Fruehauf couplers for hauling. It cites weight savings of aluminum supports up to 125 pounds and aluminum wheels up to 107½ pounds per axle. It also includes data on the eight U. S. and Canada plants and the sales and service network of the company.

More than 300 nominal-length variations are available from the 29 basic Fruehauf models. Standard gasoline-tanker bulk capacities range from 2,000 to 5,000 gallons. Capacities of standard tandem-axle tank trailers range from 4,000 to 6,500 gallons.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 134.

Cullen for B-K in West

J. P. Cullen now heads the west-coast office of the Construction Equipment Department of the Blaw-Knox Division, Blaw-Knox Co., Pittsburgh, Pa. He formerly handled the Eastern District sales territory for the Clamshell Bucket Department of the division.

Louis J. Sarosdy, who opened the west-coast office, is returning to his position as Chief Engineer of the Construction Equipment Department and Sales Manager of the Heavy Steel Forms Department in the division's Pittsburgh office.

Manning Heads Stewart

Vice Admiral John J. Manning (CEC), USN, Ret., is now President and Director of James Stewart & Co., Inc., engineering and construction firm with offices in New York, Chicago, Washington, and Dallas. He will be in charge of all operations of the 107-year-old organization. Admiral Manning was formerly Chief of Civil Engineers and Chief of the Bureau of Yards and Docks of the Navy Department.

The Stewart company also announces that its Panhandle holdings were recently purchased by M. Seth Horne & Associates, completely severing the organization from the Panhandle Pro-

ducing & Refining Co. which had held control. The new owners are reorganizing the corporation, and together with the old Stewart employees, they constitute the present management and board of directors.

Changes at Armco

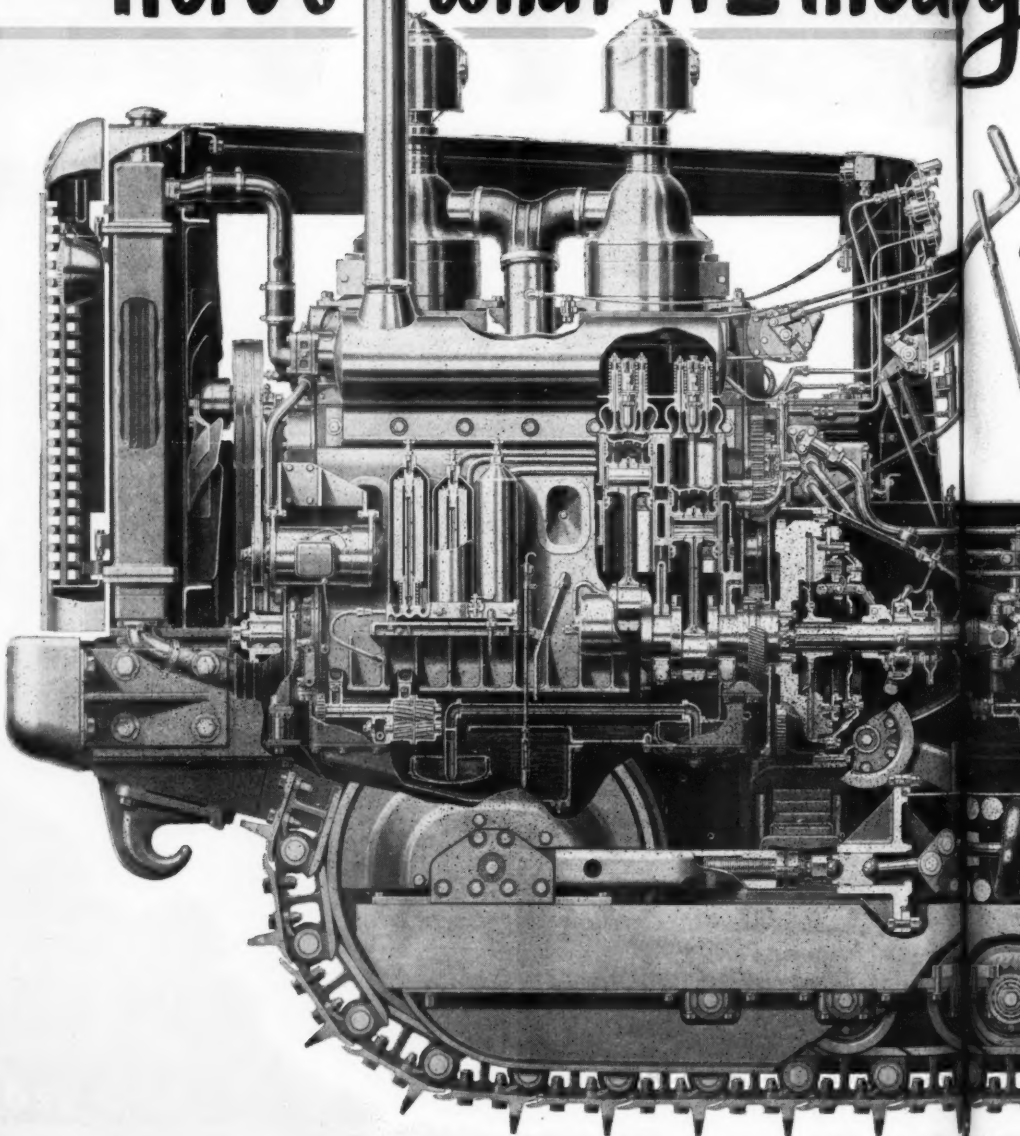
W. F. Tuttle, formerly Assistant Chief Engineer, is now Chief Engineer of Armco Steel Corp., Middletown, Ohio. He replaces E. N. Millan who has asked to be relieved as the active executive head of the engineering division of the company. Mr. Millan will continue to serve Armco in a consulting and advisory capacity.

Proper Welding Symbols

A new folder containing a concise summary of all welding symbols standardized and adopted by the American Welding Society is available from The Lincoln Electric Co., Cleveland 1, Ohio. It is designed for quick reference by all persons concerned with a welding program. It includes specifications tables on different types of electrodes and suggestions for good welding designs. The symbols were standardized to cut drafting and shop cost.

This literature may be obtained from the company by requesting Bulletin 458, or by using the Request Card at page 16. Circle No. 114.

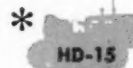
Here's what WE mean



40.26 drawbar hp.
11,250 lb.



70 drawbar hp.
18,800 lb.



102 drawbar hp.
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Hydraulic Torque Converter
175 net engine
41,000 lb.

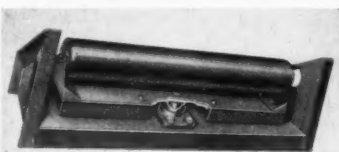
The Newest, Finest Tractor Line on Earth!

• DESIGNED FOR YOUR JOB • BUILT TO TAKE IT • EASY TO OPERATE • EASY TO MAINTAIN

Self-Aligning Idler

An improved self-aligning return idler for belt conveyors is manufactured by Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis. Equipped for high-pressure greasing with hydraulic-type fitting as standard, it can be supplied with 4, 5, or 6-inch-diameter steel rolls, and also with a 5½-inch-diameter rubber-covered spiral roll.

The Rex Style No. 33RA idler provides automatic alignment for the return run of the belt without the use of side guide rolls, the company says. It is mounted on a roller-bearing turntable, with the assembly tilted 45 degrees in the direction of return belt



The Rex 33RA return idler for belt conveyors is self-aligning. It can be supplied with 4, 5, or 6-inch-diameter steel rolls.

travel. The company recommends that one idler be located close to the head pulley to center the return run, one close to the tail pulley to center the belt for loading, and additional units

at ten to fifteen normal return-idler spacings, as conditions warrant.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 140.

B & D President Dies

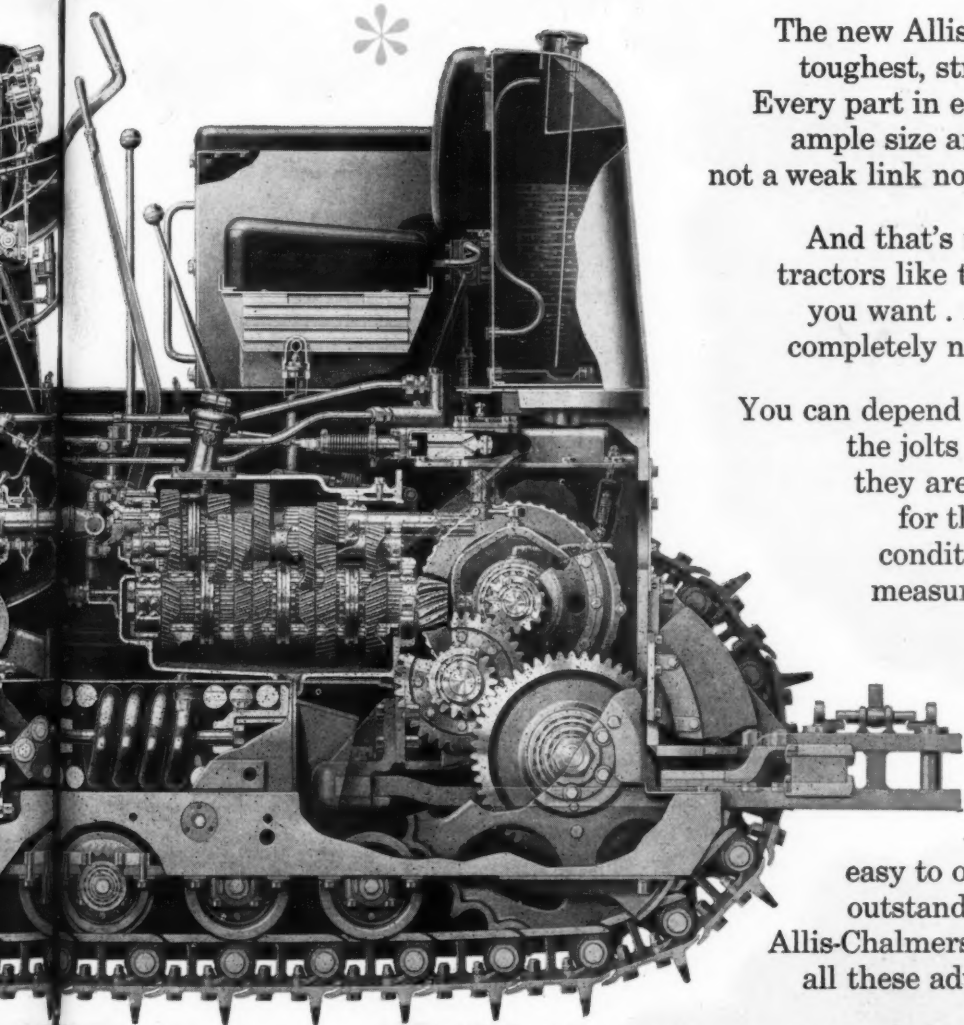
S. Duncan Black, President of The Black & Decker Mfg. Co., Towson, Md., manufacturer of portable electric tools, died on April 15. Mr. Black and Alonzo G. Decker founded B & D 40 years ago. They then employed seven machinists who worked in rented warehouse space. Today the company employs 4,000 in its world-wide organization, has sales of \$24,000,000 annually.

Winter Spraying Kills Brush

Tests conducted by Dow Chemical Co., Midland, Mich., show that it is possible to kill brush during the winter by spraying. In the Dow method, trunks or stems are sprayed to a height of 12 to 18 inches above the ground line with Esteron 245 in diesel fuel or kerosene. The rate of application is one pint of Esteron to 3 gallons of oil.

The company points out that by using this method, which is particularly effective in late winter or early spring, highway departments can spray at a time when other chores are not competing for attention and when there is less danger of injuring farm crops.

BUILT TO TAKE IT



The new Allis-Chalmers tractors are the toughest, strongest tractors ever built. Every part in each of the four models has ample size and strength to do its job — not a weak link nor a compromise anywhere.

And that's no accident! To bring you tractors like these . . . with the qualities you want . . . Allis-Chalmers built 'em completely new — from the ground up.

You can depend on them to take the loads, the jolts of today's jobs . . . because they are modern tractors designed for the most grueling operating conditions. They will more than measure up to your expectations!

Here are just a few of the many reasons why this **NEWEST, FINEST TRACTOR LINE ON EARTH** is *Built To Take It* . . . besides being easy to operate, easy to service and outstanding in performance. Your Allis-Chalmers dealer will gladly explain all these advantages . . . see him NOW.

- All-Steel Welded Construction
- More Power with Bigger Engines — Longer Engine Life
- More Weight, Greater Strength
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- Works in Oil on HD-9, HD-15, HD-20
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ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Bituminous Seal Coat Uses Precoated Stone

Seal Coat Is Put Down on Gravel Subbase for 5.2-Mile Secondary-Road Project in Vermont

• THE Vermont Department of Highways added another section of paved road to its system with the completion of a 5.2-mile contract on State Route 8 in the towns of Wilmington and Whitingham, county of Windham. A secondary-road project, the job starts at the intersection of State Route 9, a cross-state highway, and runs southerly toward Jacksonville near the Vermont border. Before the improvement, the unpaved road had a gravel-dirt topping 18 to 20 feet in width.

Now it has a blacktop surface consisting of a bituminous seal coat, using pretreated aggregate over a gravel subbase primed with tar. The new pavement is 20 feet wide flanked by 4 to 6-foot shoulders. Sideslopes are 1½ to 1.

Work on this project got under way in November, 1949, after the Vermont Department of Highways awarded a \$256,302 low-bid contract to the S. V. Rossi Construction Co. of Torrington, Conn. The following month the New England winter put a halt to operations for the season. Construction was resumed in April, 1950, and by last November the job was completed.

Grading

Except for one mile of new location, the alignment holds closely to that of the existing road. Clearing, grubbing, grading, and drainage were the first items put under construction. Rock excavation, including both roadway and channel, amounted to approximately 25,000 cubic yards, while the common or dirt roadway excavation totaled around 30,500 cubic yards. Most of the rock in the roadway section was encountered in the new location at a cut 40 feet in depth, which was removed in two lifts. Ingersoll-Rand drilling equipment was employed on the rock work—two wagon drills, three Jackhammers, two 315-cfm air compressors, and one 105-cfm air compressor. Drill holes were charged with American 40 per cent dynamite.

Excavating equipment included a Thew-Lorain 2-yard and a Northwest 1½-yard shovel; a Link-Belt Speeder trench hoe and a Lorain ¾-yard Backdigger; and a Lorain ½-yard rig, a hired unit engaged for only part of the time. Material was hauled in 5 Sterling, 4 Ford, and 2 Mack trucks, averaging 5 to 6 yards a load. The average dirt haul was one mile, while some of the rock cut was moved as much as 3 miles. Three tractor dozers were on the job—two Caterpillars, a D8 and a D7, and an Allis-Chalmers HD-10.

The backhoes were used primarily in digging trenches for the drainage pipe and setting the heavier sections. Reinforced-concrete pipe, 15 to 60-inch diameter, totaled 1,644 linear feet, and was furnished by the Vermont Concrete Pipe Co. of Windsor, Vt. The New England Metal Culvert Co. of Palmer, Mass., supplied 2,906 linear feet of asphalt-coated, corrugated, galvanized-metal pipe in 15 to 72-inch diameter sizes. The contract also included 2 MultiPlate arch culverts 83 feet long x 11 feet in width.

Gravel Subbase

The original roadbed had a gravel topping averaging 6 inches deep. On top of this went a new gravel subbase, 16 inches in depth, for the full width of the roadway—a maximum of 32 feet including the shoulders. Gravel was obtained from a pit in Searsburg, 12

miles from the job, and was hauled in a fleet of 22 trucks, some owned by the contractor and the others hired. It was spread in 6 to 8-inch layers, and shaped by a pair of motor graders—a Caterpillar No. 12 and an Austin-Western 99-M. Compaction was achieved with a Buffalo-Springfield 10-ton 3-wheel roller.

Over this subbase went a 2-inch compacted course of crushed gravel that contained approximately 65 to 70 per cent metal. The 1½-yard shovel dug the material from the gravel pit

and loaded into three Linn 8-yard Haftraks which fed a Tel-smith 10 x 36 crusher equipped with a screen to remove anything over a 2-inch size. A couple of trucks hauled the crushed and screened gravel to stockpiles. From there a ¾-yard shovel loaded the material into trucks for transporting it to the road. Two Buckeye spreaders, working side by side, laid the gravel in 10½-foot strips for a total base width of 21 feet.

The gravel base was then primed with RT-5 tar applied at the rate of 0.35 gallon to the square yard at 150 degrees F. All bitumen for the job was supplied by the American Tar Co. of Boston, Mass. The tar came from the Springfield, Mass., headquarters of the company in feeder tank trucks, and was transferred at the job site into a bituminous distributor, a Kinney 1,500-gallon unit mounted on a Mack truck. It was shot in two 10½-foot lanes while the road was kept open to traffic. A blot covering of sand was spread over

(Concluded on next page)



C. & E. M. Photo

A Nelson bucket loader loads precoated peastone from stockpiles into a Chevrolet truck with a Gar Wood body. It was used on the S. V. Rossi 5.2-mile job on State Route 9, a secondary road, in Vermont.

Users

Boost Production...

Lower Costs

Bucyrus-Erie

22-B

10-B

15-B

51-B

54-B

the tar by hand, and the surface then received a pass with a broom drag, followed by rolling.

Bituminous Seal Coat

At least seven days after the tar priming, a bituminous seal coat was put on in a single application. RC-2 asphalt for the seal was shipped by the American Tar Co. in tank cars from Boston, Mass., to a siding of the Hoosac Tunnel and Wilmington Railroad at Readsboro, a 12-mile average haul from the job. At the siding it was transferred to the distributor which applied it full width with a 20-foot spraybar at a temperature of 180 degrees F and at the rate of 0.3 gallon to the square yard.

Traffic was halted temporarily while the bitumen was shot for short runs of from 400 to 500 linear feet. The asphalt was immediately covered with peastone, graded from $\frac{3}{4}$ down to $\frac{1}{2}$ inch, applied at the rate of 30 to 35 pounds a square yard. The peastone was pretreated with MC-O asphalt, mixed with the stone



C. & E. M. Photo

A Kinney 1,500-gallon distributor mounted on a Mack truck applies RC-2 asphalt through a 20-foot spraybar to State Route 8 in Vermont.

at the rate of 2 gallons of bitumen to one cubic yard of aggregate. Supplied by the Northfield Sand & Gravel Co. of Northfield, Mass., the peastone was delivered by truck and stockpiled at two locations near the north and south ends of the job. The mixing was done by spraying the bitumen with a hand hose

attached to the distributor, as a crane and clamshell bucket worked over the aggregate stockpiles.

The pretreated aggregate was loaded into trucks by a Nelson bucket loader, and hauled out on the road where the bitumen was being applied. Two Buckeye spreaders, a short distance apart,

followed behind the distributor, covering the bitumen to the full width. The precoated stone was then rolled by a Buffalo-Springfield 5-ton 3-wheel roller, and the road was opened to traffic.

Quantities and Personnel

The major items in the 5.2-mile secondary-road contract included the following:

Common excavation	27,000 cu. yds.
Rock excavation	14,130 cu. yds.
Borrow excavation	30,800 cu. yds.
Channel excavation	18,000 cu. yds.
Subbase gravel	47,200 cu. yds.
Crushed gravel	5,300 cu. yds.
Bitumen	44,000 gals.

At the peak of construction operations the S. V. Rossi Construction Co. employed an average force of 75 men under the supervision of Reno Rossi, Superintendent.

For the Vermont Department of Highways, Thomas Dudley was Resident Engineer. Hubert E. Sargent is Chief Engineer of the Department, and F. C. Coates is Construction Engineer.

Power Is Stored By Accumulators

Hydraulic accumulators, a development in applied engineering, are finding many uses in the construction industry. They are able to store fluid energy and to control its delivery, and they may be used on almost any type of hydraulic system. In test performance the accumulator has been used to dampen out pump pulsations in hydraulic lines, to store an energy beyond the capacity in horsepower of the original power source, and to act as a safety device when the original source of power is cut off or damaged.

The accumulator stores power much as a battery stores electricity. Oil is fed into it by the usual hydraulic sources, and pressure gradually builds up to a high value. When this energy is tapped, it will deliver power for short periods in excess of the power source.

This simple device is available in sizes to meet individual requirements. It has been used on a heavy-duty excavator to store fluid pressure which, if there is a power failure, automatically sets all the brakes (hoists, swing, and propel) to avoid dropping the dipper and prevent swinging of the revolving upper.

Greer accumulators have also been used as a source of "canned" power where need is intermittent. On a large hydraulic press the power was tapped only once in ten minutes, and engineers found that a $1\frac{1}{2}$ -hp motor which delivered oil to the accumulators could replace the 50-hp motor previously used. The accumulators may also serve as shock absorbers, smoothing out the pulses of pumps which force oil through pipelines or do similar jobs. Fitting roller or rocker bearings on rock crushers with accumulators may help eliminate damage from foreign objects or unbreakable rocks.

Literature which describes hydraulic accumulators in detail and suggests additional applications may be obtained from Greer Hydraulics, Inc., 454 18th St., Brooklyn 15, N.Y. Or use the Request Card bound in at page 16. Circle No. 123.

NPA Appoints Neal Higgins

Neal Higgins, Manager of Industrial Sales for International Harvester Co., Chicago, is Acting Director of the Construction and Mining Machinery Division, National Production Authority. This division is responsible for production and distribution of the construction, mining, and oil-drilling machinery needed in the defense program and for essential civilian activity.

Mr. Higgins is on leave from his post at International Harvester. He has been with the company since 1928.

Output Leaders



Helping contractors get new speed, efficiency and economy in their operations is an old story to Bucyrus-Erie excavators. They've done it on a thousand-and-one different jobs — as shovels, cranes, draglines, clamshells and dragshovels.

It's easy to match job requirements exactly with one of the machines in Bucyrus-Erie's $\frac{3}{8}$ - to 4-yard line of gasoline, diesel, or single motor electric

excavators. Each model has size and strength to handle its rated capacity regularly. This means less "time out" for expensive maintenance, more time on the job, building profits.

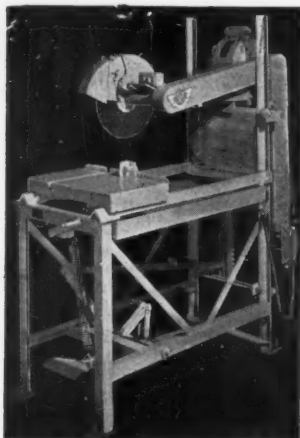
There's strength behind this top-notch line, too . . . your Bucyrus-Erie distributor. He's staffed and equipped to give you the service you need, when and where you want it.

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most compared...
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**BUCYRUS
ERIE**

South Milwaukee,
Wisconsin



The Speed Kut masonry saw does wet and dry cutting, using abrasive or diamond-type wheels.

Wet-Dry Masonry Saw

A new masonry saw for both wet and dry cutting is made by Supreme Equipment Corp., 12415 Euclid Ave., Cleveland 6, Ohio. The Speed Kut uses abrasive or diamond-type cutting wheels. Its all-steel frame is constructed to withstand hard use, the company says.

A waist-high handcrank automatically controls and fixes the self-locking wheel-positioning mechanism. By turning the crank the operator can adjust the machine to cut any commercial size of block, flat or endwise. A toe pedal feeds the cutting wheel into the work. Proper grinding-wheel pressure is maintained regardless of the pressure on the foot pedal, the manufacturer reports.

The cutting table rides back and forward on self-lubricated completely enclosed ball-bearing rollers. V-rails on either side of it are said to eliminate side-play and assure straight, accurate cutting. The water-storage and sediment drawer, which supplies water for eliminating dust and cooling the grinding wheel, is beneath the cutting table. Water is filtered prior to circulation by the self-priming pump, and a metal guard directs it from the wheel directly onto the work. The entire head assembly on the machine removes for job-to-job transfers. A control handle below the on-off switch is provided for manual operation, if desired. The machine is powered by a totally enclosed 1½-hp motor.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 219.

Air-Compressor Catalog

A 12-page catalog on gasoline and diesel-engine-driven single and double-stage compressors is available from O. K. Clutch & Machinery Co., 1964 Florence St., Columbia, Pa. It includes single-stage compressors designed to deliver 85, 105, and 160 cfm at 100-pound pressure, and 2-stage compressors designed to deliver 105, 160, and 210 cfm at 100-pound pressure. It covers types of mountings, dimensions, and weights. Four pages present construction details of both the compressor and the power source.

This literature may be obtained from the company by requesting Bulletin C-51, or by using the Request Card at page 16. Circle No. 196.

Straub Licenses English Firm

Straub Mfg. Co., Inc., Oakland, Calif., has made a license arrangement with the engineering firm Armstrong Whitworth & Co. (Ironfounders), Ltd., Gateshead-Upon-Tyne, England. The English firm will manufacture the Straub line of crushers and mining machinery and distribute it on an exclusive basis in Great Britain, Eire,

Europe, South Africa, India, Pakistan, Australia, and New Zealand. This arrangement overcomes the dollar-exchange difficulty.

A similar license, covering eastern U. S., eastern Canada, and Puerto Rico, has been given to the Pennsylvania Crusher Co., a division of Bath Iron Works Corp., Bath, Maine. Straub also plans to increase its own manufacturing facilities.

Award for Reinforcing Bar

Carl A. Menzel, of the Portland Cement Association, received the 1951 Award of the Concrete Reinforcing Steel Institute for his research and development work on deformed reinforcing bars. Mr. Menzel's work resulted in ASTM Specification A305—the first recognized standard on reinforcing-bar deformations.

The American Concrete Institute has recently revised its "Building Code Requirements" to take advantage of the new bar.

At DIGGING and LOADING — It's a PIPPIN!



The PIPPIN EXCAVATOR — a combination digger and loader attachment for Ford and Ferguson tractors —

- Back hoes, front hoes, shovels and loads
- Converts from back to front hoe in five minutes
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- Bucket capacity 1/5-yd.
- Bucket elevates to 14' above grade
- Load swings laterally to 110 degrees

For greater work capacity and lower costs, get a PIPPIN!

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PIPPIN CONSTRUCTION EQUIPMENT CO., Inc., White River Junction, Vt.

MORE VERSATILE!

HYDRAULIC ATTACHMENTS . . .

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Ripper Attachment For Scraper or Dozer

"Any scraper or bulldozer can be converted in 10 minutes to an efficient ripper with our new ripping attachment," says the Hensley Equipment Co., 878 Joaquin Ave., San Leandro, Calif. This attachment, the company points out, means double use for equipment; its wear point is 1½ inches wide and easily penetrates and rips tough ground surfaces.

Directions for installing the attachment indicate its simplicity. In the case of the scraper, the ripper assembly is placed on the cutting edge and one apron is lowered into a slot provided in the unit. There are no bolts to tighten, nor any alterations to be made on the scraper blade. To return to normal scraper operations, the apron is raised and the unit is removed by sliding it forward off the blade. This is said to be a one-man job with no special tools needed. To attach the ripper unit to a bulldozer, it is first necessary to weld brackets on the back of the blade. Equipped with the brackets, the bulldozer can be changed to a ripper by clamping on the ripping unit with bolts provided with the assembly. The bracket is said not to interfere with normal blade operations.

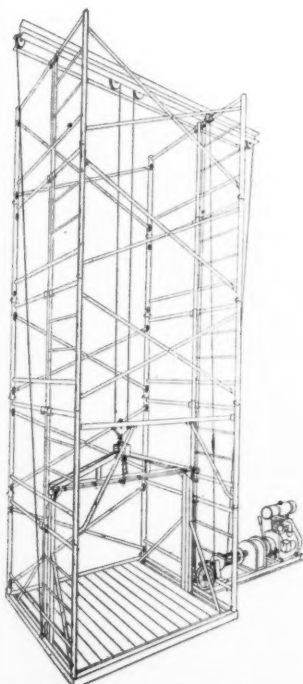
Wear points for Hensley rippers are replaceable and reversible. They are made of high-quality manganese steel heat-treated to a Brinell hardness of 525.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 116.

New Hoisting Tower Uses Scaffold Frame

A new light-duty materials-hoisting tower which employs standard sectional scaffolding frames has been developed by Wilson-Albrecht Co., Inc., 3565 Wooddale Ave., Minneapolis 16, Minn. It comes complete with gasoline or electric-powered drive, guide rails, cable and pulley equipment, cage, and clutch. It is designed to reach heights of 120 feet.

No operator is required, since a remote-control mechanism can be present to stop the platform at desired loading and unloading levels. The platform can be stopped from any height if



Waco has developed this light-duty materials-hoisting tower using standard sectional scaffolding frames. It has a capacity of 1,000 pounds at a line speed of 75 feet per minute.



The Hensley ripper attaches to scraper blades with no blade alterations or bolt tightening and without requiring special tools. Its wear point is 1½ inches wide and penetrates ground surfaces easily. Wear points are replaceable and reversible.

necessary. A built-in patented safety slack brake is an additional feature. The company reports that the tower can be erected to 30 feet in 2½ hours by two men. It has a capacity of 1,000

pounds at a line speed of 75 fpm.

Further information may be secured from the company by requesting Form PS-28B. Or use the Request Card at page 16. Circle No. 149.

Hyland, Moles President

The Moles, an association of New York heavy-construction men, elected officers for 1951 at an annual meeting dinner held in May. Richard V. Hyland, of Madigan-Hyland, New York consulting-engineer firm, is now President, succeeding James F. Salmon, New York Manager of the Arundel Corp.

Officers elected with Hyland were David Bonner of Frederick Snare Corp., First Vice President; R. E. Dougherty, Consultant to Seelye, Stevenson, Value & Knetch, Second Vice President; C. E. Simmons, Bethlehem Steel Co., Sergeant-at-Arms; George P. Walker, Johns-Manville Corp., Secretary; H. P. Maxton, Raymond Concrete Pile Co., Treasurer.

*Never-Anywhere—
A WHEEL LOADER LIKE THIS!*

Smooth, continuous crowding action with
HYDRAULIC TORQUE CONVERTER DRIVE

No gear shifting on most loading jobs
with specially designed
CLUTCH-TYPE TRANSMISSION

model TL-10

TRACTO LOADER

**Completely New . . .
Heavy-duty throughout**

Hydraulic operated bucket —
3/4-cu. yd. (standard). Other
buckets and interchangeable
attachments available.

Allis-Chalmers gasoline
engine, 40.5 brake hp

Four forward speeds —
1.9 to 18 mph. Four re-
verse — 3.5 to 28.5 mph

Weight — 10,650 lb.
Maximum clearance
under bucket hinge
— 9 ft. 10 in.

STEADY FLOW OF POWER TO DRIVE WHEELS

Torque converter drive automatically balances speed and power against load . . . crowds steadily, surely as it moves into pile . . . no engine stalls. Practically eliminates wheel spinning, reduces tire wear.

NO CLUTCHING WHILE LOADING

Operator uses only foot throttle and bucket levers to get his load. Torque converter action eliminates butting and ramming . . . reduces shock and clutch wear.

LOADS IN HIGHER GEAR

Even under unusually tough conditions, the TL-10 handles the job in second gear from start to finish — speeds work cycle and output.

LOADS BUCKET FASTER

No stop-and-go loading. Torque converter is constantly and automatically adjusting forward speed against loading resistance.

BUCKET OVER DRIVE WHEELS

utilizes weight of loaded bucket for greater traction . . . eases weight on rear steering wheels for fast maneuvering. Turning radius is only 11 ft. at tip of bucket . . . works where smaller machines are normally used.

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SINGLE LEVER CONTROL

. . . push for forward, pull for reverse

Two multiple disc clutches are built right into the transmission. One is for forward, the other for reverse. Both are operated by simply pushing or pulling a single lever. Reverse is almost twice as fast as forward.

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TRACTOMOTIVE CORPORATION • DEERFIELD, ILLINOIS

Grades Last Miles of U. S. 40 Re-Route



Pushed by an Allis-Chalmers HD-19, this Euclid scraper picks up a heavy load of dirt over one of the cut areas in the Brown Construction Co. contract near Golden, Colo.



Faithful workhorses on Brown's job were these Model W Carryalls drawn by TD-24's. The one on the far side of the cut is pushed by an HD-19 Allis-Chalmers.



A massive rocky formation required drilling and shooting. Here a powderman loads holes as the drillers behind sink wagon-drill holes for powder.



At a rocky cut along Clear Creek, a Thew-Lorain 80 shovel loads out broken stone to Koehring Dumptors, part of the rock-hauling fleet.

• THE last section of what will be a major relocation of U. S. 40 between Denver and Idaho Springs, Colo., is now being graded near Golden. Dense clay, sand, and solid rock are being moved to make way for the new highway. Brown Construction Co. of Pueblo has the 550,000-cubic-yard job under a Colorado State Highway Department contract.

For several years various contractors have fought a bruising battle to open new tunnels under the Rockies along Clear Creek, west of Golden. The new alignment and tunnel construction eliminates one bad mountain climb, and will reduce the snow-removal problem. Incidental benefits will include a new 4-lane divided highway from the present U. S. 40 route into

Realignment of a Dangerous Section in Rocky Mountains Calls for Heavy Grading Near Golden, Colo.

Golden. The tunnels and roadbed west of Golden have been designed for 2-lane single-highway operation, but the alignment is so good that 60-mph speeds should be possible.

From Brown Construction Co.'s point of view, the 4½-mile grading project has been ideal. The contract was let in late October, and because of a relatively mild winter the contractor was able to get a great deal of the pioneering done by Christmas. When work resumed February 26, Brown had plenty of equipment in from other completed projects so the Golden job could almost be overstocked. Business affairs, so far

as coming awards, were such that the company was not forced to rush the work. Brown had time to work the grading at near-perfect efficiency, and to finish it as it was done.

What the Job Includes

Brown's contract includes 4½ miles of grading, practically all on new location. Drainage, structures, and a granular-ballast subbase course for future bituminous surfacing are included. When Brown's men and equipment finish, the Colorado Highway Department can get the entire new relocation ready for traffic by letting one or more as-

phalt oiling contracts.

About 75 per cent of this job consists of a 4-lane divided roadbed 76 feet from ditch to ditch, with a 30-foot dividing median which is being graded to help drainage along. The graded embankment is being crowned with an outward slope from center line of 0.015 foot per linear foot.

Full-width granular ballast will go over the dense subgrade. Soil bearing conditions vary so widely that subbase thicknesses range from 6 to 16 inches. The two paved surface lanes are each 24 feet wide.

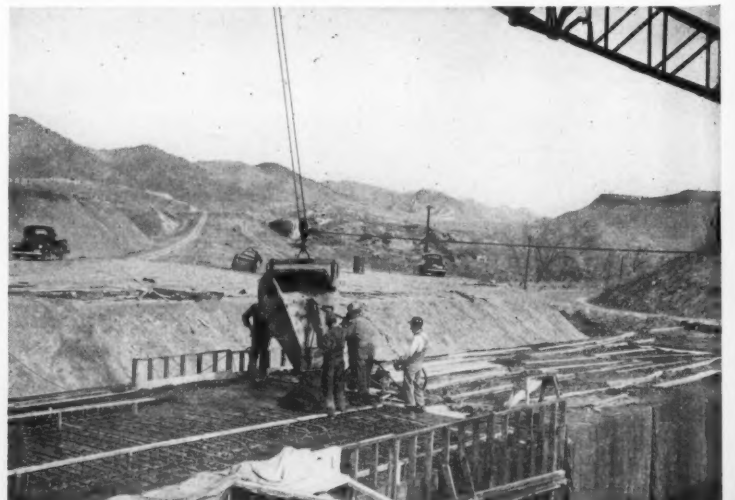
Earth Grading Is Routine

Excavation quantities were balanced between cut and fill, and with the ex-

(Continued on next page)



Brown's contract calls for structures too. This Ford-mounted Dumptrete is delivering concrete to the laydown-type bucket which transfers it to the pour.



Here concrete goes into one of the large culverts on the job. George Carlson and Ollie Bertram are superintending this work for Brown.

ception of some stiff clay and long-haul operation, most of the earth grading in the contract is routine. Grading consists simply of moving the material from cuts, hauling it to the fill sections, and processing it there to get 90 per cent of modified AASHO density on subembankments, and 95 per cent on the top 4 feet.

Two of the large-model Euclid tractor-scraper combinations are a part of the dirt-grading fleet. Equipped with powerful engines and fast travel gears, these units are moving dirt on both long and short hauls at speeds up to 30 miles an hour.

The tractor-scraper crawler group includes three International TD-24's with Model W (23-yard) LeTourneau Carryalls. Fast for crawler outfits, powerful and dependable, these units recently were making a full cycle on a 2,400-foot one-way haul in 8 minutes. International has recently added a forward track roller to the TD-24, and it seems to make it roll better.

For finish work, there is a D8 and a LeTourneau Model F finishing Carryall. Finish work on subgrades, as well as bank sloping, is done by a pair of Caterpillar No. 12 motor graders. There are four HD-19 Allis-Chalmers tractors available for miscellaneous dozing and pusher work. Even the TD-24's, incidentally, have Bucyrus-Erie push blocks. They sometimes help each other load, but so much good equipment was available that it hasn't been the rule on this project.

Compaction equipment includes five double sets of McCoy sheepfoot rollers, with D7's and D8's for moving power, and two 2,700-gallon sprinkler tanks mounted on Ford F8's.

Formations are spotty in the entire area, and frequently within one station length there will be sand, conglomerate, and stiff pottery clay. A run of good spring weather and an absence of excessive snowfall during the winter left the material in good condition, and there are few if any places where the moisture content is over the optimum compaction range. The material digs beautifully, as a rule, and compacts readily to good densities. About 6 roller passes will develop the 95 per cent compaction on an 8-inch lift.

Good Tricks on Rock Excavation

West of Golden, up the Clear Creek Canyon, the highway grade is being pushed through a massive rocky formation which requires drilling and shooting. The methods and organization on rock excavation are particularly efficient.

Maximum wagon-drill steel lengths of 16 feet are being used, because they give more accurate control over the slope holes and give the shovel a safer bank on which to work. The rock is being shot purposely to leave a few large pieces near the top of a lift, so that about 1,500 tons of riprap can be made at the same time rock excavation is under way. The big pieces usually are left at the top, where heavy stemming covers the powder charges to a depth of about 8 feet. If they were



C. & E. M. Photo

Structure concrete on the Brown contract was mixed in this small setup—Blaw-Knox bins and a CMC 16-S mixer. That's Ideal sacked cement in the background.

at the top of a bank higher than 16 feet, they might roll down and damage the shovel. At the very best they would be hard to handle.

Another thing Brown is doing is

scaling the rock slopes as each 16-foot block is removed from a cut. It finishes the slope as it is created, and the scaler never is more than about 16 feet from the ground. This contractor

recognizes the fallacy of hogging out a rock cut only to have to go back in and finish the job at great expense. By doing the work completely as it goes along, production is much more constant and the state engineers are particularly happy.

The sharp rock slopes are being precision-blasted by drilling short slope holes to exact grade, and protecting the slope by proper loading. Four Gardner-Denver UMB55 wagon drills are sinking the holes. Three 640-cfm Gardner-Denver compressors and an Ingersoll-Rand 315-cfm portable are available. Timken tungsten-carbide bits and Timken steel are used exclusively. They even have a small pneumatic grinder which mounts on a compressor frame, and the compressor operator has been trained to touch up the bits as they wear.

Footage is excellent. Each wagon drill is getting from 500 to 700 feet per 8-hour shift, and the drill bits frequently last two shifts even in the

(Concluded on next page)

① CRAWLER TYPE

- Available in capacities up to 120 Tons
- Travel speed up to 1 M.P.H.
- Requires one operator
- All major operations controlled by air (excluding Type 34)
- Steers from the cab

② WHEEL TYPE

- Types 34 and 604 available with wheel mounting.
- One engine powers all operations, including travel
- One operator controls all operations from cab
- Rotating assemblies have same basic features as corresponding crawler machines

③ TRUCK TYPE

- Mounted on 10-wheel truck carrier
- Powered by two engines
- Requires two operators
- Can travel up to 31 M.P.H.
- Available only with Type 34 rotating assembly

3 Ways to faster-more efficient Crane Service

CRANES—Crawler mounted - truck mounted - wheel mounted - Baldwin-Lima-Hamilton builds them all and in sizes that will best meet your requirements. When mounted on rubber they are available in capacities up to 35 tons. They will go anywhere you can drive a truck and at speeds up to 31 M. P. H.

For work where mobility is not an important factor, LIMA crawler mounted cranes can be furnished in capacities up to 120 tons. To increase their range of usefulness a variety of attachments are available: shovel, dragline, clamshell, pullshovel and pile driver. Each attachment is interchangeable. For faster, more efficient crane service buy the crane that is first in quality—first in safety and reliability—BUY LIMA.

LIMA Shovels, Cranes and Draglines are built in the following capacities—Shovels $\frac{3}{4}$ to 6 yards, cranes to 110 tons and draglines, variable. Rubber-mounted Truck Cranes in 20 and 35 ton capacities.

It will pay you to consult your nearest LIMA Sales Office or Representative before you buy your next shovel, crane or dragline. Offices in principal cities of the world.

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$\frac{3}{4}$ TON WINCH

This Hand Winch is ideal for moving and installing heavy machinery, loading trucks, hand derricks, cranes, etc. Can be bolted anywhere and operated in any position. Made of electric steel; bronze bushed; 3 speeds, 8.16 to 1 for heavy loads.

operation . . . self locking to hold loads at any position. Overall Dimensions 18 1/2 in. x 7 1/2 in. x 7 in. Handle 10 in. long. Drum size 5 in. dia. x 6 in. long x 6 in. dia. Sanges. Will hold 100 ft. 1/2 in. Wire Rope. Illustrated with 50 ft. 1/2 in. Wire Rope. Shipping Wt. 87 1/2 lbs. GUARANTEED—Five-day return privilege. \$43.45 WITH 50 FT. OF 1/2 in. WIRE ROPE

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GOLD FOUNDRY & MACHINE WORKS
1010 S. Duane St., Dept. CE, Indianapolis, Mo.

Grades the Last Miles Of U. S. 40 Re-Route

(Continued from preceding page)

granitic formation. The holes go in on a 7-foot pattern—that may vary slightly in different formations. The bottom of all but the short slope hole is sprung so the pocket will take about 30 sticks of Du Pont 40 per cent Special gelatin. The drill hole is then barrel-loaded to within 8 feet of the top, and covered with sand or dirt stemming.

They pull about 100 to 150 holes at a time, using the 110-volt current on a welding machine to explode the charges. No delays are being used. Atlas Rockmaster detonators fire the powder charges. Excellent fragmentation is the rule, and the percentage of oversize for riprap is just right.

The Thew-Lorain 80 shovel and 1¾-yard Amsco dipper which loads broken stone makes no special attempt to segregate the riprap, unless there are several chunks within dipper reach to make a special load. Ordinarily the riprap is loaded out with the rest of the rock, and separated by the dozer which builds the rock fills. The main rock-hauling fleet consists of 6 Koehring Dumpsters and a small 7-yard Euclid, and for a time 6 International K-11 trucks were used.

Rock fills are put in lifts not to exceed in thickness the average dimension of the largest rock. As a rule, 2-foot lifts are about the maximum. One heavy rock fill joins the ends of a new bridge over Clear Creek, and forms a base for the two approaches.

Concrete Culverts Made

The project calls for some of the largest concrete box culverts the Brown firm has made in recent years. One structure is 175 feet long, and of 8 x 10 double construction. Another, of the same length, is a 10 x 10 double.

Forming for these culverts consists of plywood facing and 2 x 4 studs at 12-inch centers, with Superior form ties and timber shores under the top form.

A Blaw-Knox 3-compartment manual batcher weighs out sand and two sizes of rock aggregate, which comes in from a commercial plant near Golden. A Hough Payloader keeps the bins charged. Concrete temperatures are controlled between 60 and 70 degrees by using mixing water from 160 to 180 degrees. It comes from a large vat, heated by lumber scraps from the carpenter yard. An oil-fired heater was used for a time, but it had to leave for an oiling job.

Proportioned aggregates from the batch bins travel by conveyor to the skip of a CMC 16-S mixer, and Ideal sacked cement and Protex air-entraining agent are added. The mixed concrete is delivered to the pour by two Ford-mounted Dumperets. A Lima crane with a 1-yard laydown bucket transfers the concrete to the pour, where Viber electric vibrators consolidate it in conventional style. The tops of the culverts are wood-floated, and screeded to close tolerance.

In the same location where the batching plant is set up, which is in the center of the section, a Cedarapids crushing plant is starting to produce the subbase ballast. The pit is well graded, and the crusher can be fed by a D8 and dozer, pushing to a trap. When CONTRACTORS AND ENGINEERS MONTHLY visited the job, no installation of ballast had started. But they expected to haul it in F-8 10-yard tandem trucks, spread it in two lifts, sprinkle it, blade-mix the material, and finally lay it with the help of rubber-tire rollers.

Personnel

Field operations, under the general supervision of Carroll and Clarence Brown, are directed by General Superintendent H. P. Graham, an experi-

enced road builder with many years in Colorado and New Mexico. Dan Ratliff is the Rock Superintendent, George Carlson and Ollie Bertram are on concrete structures, George Kuntz is Master Mechanic, and Hank Eberhart and Joe Miller supervise the dirt spreads.

State operations are under the general supervision of Mark Watrous, State Highway Engineer; Harvey Stitt, District Engineer; and Bus Gray, Resident Engineer.

"Magic" Black Light For Traffic Warning

State highway officials may take a tip from roadside advertisers by using new black-light fluorescent traffic-warning signs, as an aid to traffic law enforcement.

Black-light signs have been designed by James A. Norris Co., 392 Bleecker St., New York 14, N. Y., and have been used experimentally in a 6-month



Night-time speeding has been cut 35 per cent in River Grove, Ill., since these blacklight fluorescent warning signs were installed.

test in River Grove, Ill. The words are painted in a blue-white luminescent pigment on a black board, 48 x 48 inches. They are said to shine bril-

liantly in the dark when lighted by invisible ultra-violet rays known as Kolite blacklight, from an 80-watt fixture at the top of the sign. In the daytime, the sign looks like any other painted warning sign. It is reported that the signs are visible at 200 yards and can be clearly read at 200 feet. The company claims that maintenance cost of the sign is negligible. The lettering, the size and shape of the sign, and its position may be varied to suit individual needs.

Further information may be obtained from the company. Or use the Request Card at page 16. Circle No. 167.

Caterpillar Ups Sonneman

E. C. Sonneman is now Assistant Export Divisional Manager of Caterpillar Tractor Co., Peoria, Ill. He was previously a district representative in South America. His new position is in the Latin American Division which includes the countries of Central and South America.

9% MORE OUTPUT with



In addition to 1-second gravity dumping, Koehring Dumper is fast spotting at the hopper or edge of bank. There's no slow jockeying back and forth. With same speeds forward and reverse, Dumper drives up, body forward, dumps and heads back without turning.



Fast-cleaning, scoop-shaped body has all-welded sides, ends and bottom heavily-reinforced with 4" channel ribs for rock service. More than triple strength is built into steel-ash-steel bottom. Free-swinging kick-out pan adds another steel layer for extra protection.

Two-Way Portables For Field Contact

Two new portable FM two-way radio telephone units, which can be either hand-carried or back-packed, have been developed by Link Radio Corp., 125 W. 17th St., New York, N.Y. The Pack Set Type 3035 is a complete portable assembly for operation in the 25 to 50-mc band, while Type 3036 operates in the 152 to 174-mc band. The company points out that both bands are in the very-high-frequency range.

The units weigh 19 pounds. They have a standard battery complement which provides 50 to 100 hours of intermittent transmitting and receiving service. The R-F power output is about 1/4 watt from the 152/174-mc transmitter and over one watt from the 25/50-mc transmitter, Link says. Audio output into an in-the-case loudspeaker is one watt. Receiver sensitivity in both bands is one microvolt for 20-decibel quieting. Suitable antennae



Link's two new portable FM two-way radiotelephone units can be hand-carried or back-packed. The 3035 operates in the 25/50-mc band; the 3036 in the 152/174-mc band.

are supplied with each Pack Set. The units feature a completely self-contained dry-battery power supply with a handy top handle or adjustable carrying straps when back-packed. Immediate communication contact can be made from any point in the field, the

company reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 133.

Details on Welding Shops in Your Area

Operators of heavy equipment who want information on shops equipped to provide full service in automatic rebuilding and hard-facing may obtain it from the Stoodly Co., 11936 E. Slau-son Ave., Whittier, Calif. From a few widely scattered welding shops, the number of organizations equipped to provide complete custom rebuilding service is now well over 100. Most of them, the company says, are prepared to handle various tractor parts, crushing equipment, heavy trunnions, speeder and locomotive wheels, crane brake drums, sheaves, and other equipment subject to severe wear.

Stoodly explains that while the automatic method was first accepted be-



Stoodly 105 hard-facing wire is applied automatically to a TD-24 idler.

cause of its economies—equal or better service at about half the cost of replacements—much of the increase in custom rebuilding can be attributed to shortages that have made the process a must if equipment is to be kept rolling.

Further information on rebuilding and hard-facing, and data on welding shops prepared to render this service, may be obtained from the company. Or use the Request Card at page 16. Circle No. 212.

Gasoline Chain Saw With New Belt Drive

A new 27-pound chain saw is announced by Homelite Corp., 71 Riverdale Ave., Port Chester, N. Y. Powered by a 4-hp gasoline engine, it has two features said to develop fast cutting speeds. First of these is the Gilmer belt drive, recently developed by United States Rubber Co., which eliminates drive gears. Second feature is the narrow-kerf Homelite chain.

The new unit will be offered in a range of blade sizes: one-man straight blades in 18, 23, and 30-inch lengths; two-man straight blades in 23, 30, and 42-inch sizes; and bow saws for one or two-man operation in 19 and 25-inch sizes.

A throttle button on the handle controls the unit. An automatic centrifugal clutch stops the chain when the engine idles, and prevents overload when the chain binds in the cut. The concentric-bowl carburetor is said to permit operation at extreme angles. There are ball and needle bearings at every point of friction. A built-in engine governor is designed to keep the engine from racing when the saw is out of cut. The change from vertical to horizontal cutting positions is made by pushing a button and rotating the saw. The carburetor swivels with the control handle. The weatherproof ignition and cleaner are designed for simple engine starting.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 169.



A Gilmer belt drive and a narrow-kerf chain make a fast cutter out of the Homelite 26LCS gasoline chain saw.

1-SECOND GRAVITY DUMP



It takes just one second to dump a full 6-yard load with Koehring heavy-duty Dump-tor. Operator trips the body release lever and gravity instantly tilts the scoop-shaped body 70° . . . one second later the body is empty, and Dump-tor is on its way back for another load. Because there's no waiting for slow-acting body hoists, Dump-tor saves 15 to 25 seconds every dump. This adds up to important gains in yardage output. At 16 trips per hour on a 1,000' haul, 20 seconds dumping time saved on every cycle gains 5.3 minutes more productive haul-time . . . adds 9% to hourly yardage output.

This is typical of Koehring Dump-tor's basic principle . . . to reduce all non-productive time to the absolute minimum . . . and to increase work-time for more yards per hour, more profit per yard for you. Dump-tor has many other cost-cutting advantages worth checking . . . see your Koehring distributor.

KOEHRING COMPANY, Milwaukee 16, Wis.

K110

KOEHRING DUMPTOR®

SUBSIDIARY COMPANIES: KWIK-MIX • JOHNSON • PARSONS

Mobile Batch Plant Works Right on Site

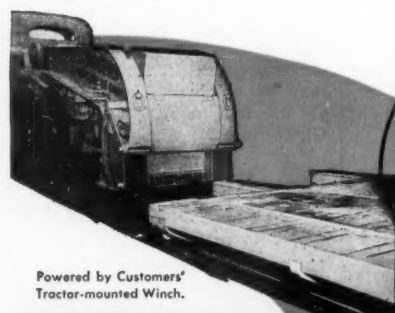
A new type of portable concrete weighing batcher has been introduced by Mixermobile Manufacturers, 8027 N. E. Killingsworth, Portland 20, Oreg. Combined with the Mixermobile portable concrete-mixing and elevating unit and the Scoopmobile, the new unit is a completely portable field concrete-mixing plant. The manufacturer claims for it a capacity of up to 50 cubic yards per hour. It handles production from raw materials to mixed and poured concrete, with one operator for each of the three units.

The unit weigh-batches aggregate on the job. It can be charged by the Scoopmobile from storage piles or directly from dump trucks. Three 7-cubic-yard bins and a 2-cubic-yard skip store up to 23 cubic yards of aggregate. The unit can be set into operation in 15 minutes, the company says.

The Weigh-Batcher is mounted on 8:25x20 tires and travels at normal



This mobile field plant made by Mixermobile weigh-batches concrete aggregates on the job. It combines the Mixermobile concrete-mixing and elevating unit and the Scoopmobile, and has a capacity up to 50 cubic yards an hour.



Powered by Customers' Tractor-mounted Winch.

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ROGERS POWER LIFT, DETACHABLE GOOSENECK TRAILER

PATENTS PENDING

Frame is lowered to ground without need of blocking. Maximum height of 16" assures rapid, safe loading of equipment.

Complete Literature available upon request—Any Rogers Dealer will demonstrate its features right on your desk, with an OPERATING SCALE MODEL.

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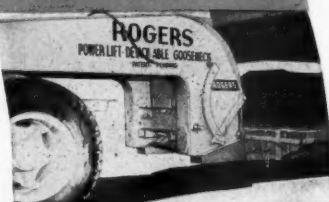
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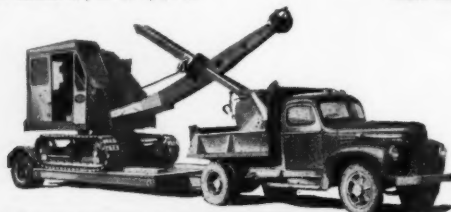
RAISES ITS DECK TO CLEAR HIGH BANKED CROSSINGS



STOOPS TO CLEAR LOW OVERHEAD OBSTRUCTIONS



CARRIES HEAVIER LOADS MORE PROFITABLY ON LARGER TIRES



Also of timely interest is this ROGERS Tag-A-Long trailer which makes a dump truck serve as a tractor and effects sizable savings for contractors.

highway speeds. It is powered by a gasoline engine. Its total weight is 17,800 pounds. It is 12 feet high, 8 feet wide, and has an over-all length of 28 feet with the charging skip down. It can be equipped with either dial or beam scales to weigh aggregate.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 117.

New Pretested Binder Holds 20-Ton Load

Five new load binders, with capacities ranging from 16,000 to 40,000 pounds, have been placed on the market by Lebus Rotary Tool Works, Inc., Longview, Texas. They feature flange-type construction to keep the handles from spreading, and ball-and-socket swivels forged and formed so they cannot bind or pull apart. These Bulldog binders are drop-forged of high-quality carbon and alloy steels, and are heat-treated after forging for extra strength and durability. Before shipping, each binder is tested on a pull-test machine. Proof-tested capacities are 8, 11½, 14½, 17½, and 20 tons. Handle lengths range from 16 to 23 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 215.

Concrete-Cribbing Data

An 8-page brochure presenting a case history of both open and closed-face concrete cribbing is available from Universal Concrete Pipe Co., 297 S. High St., Columbus, Ohio. Drawings show typical wall sections of varying lengths, and the booklet gives engineering specifications and instructions together with several photos of cribbing manufacture and actual installations.

When concrete cribbing is used, Universal Concrete says, walls can be built in restricted areas and in foundation soils where piles or caissons would be needed under heavy-mass walls. Drain pipes and sewer connections are seldom needed; no special equipment or skilled labor is required and only min-

imum excavation and shoring. The wall is loaded during excavation and the embankment is placed immediately after completion. Standard precast units are available for emergency use; wall height can be increased if necessary; and the entire wall is salvable.

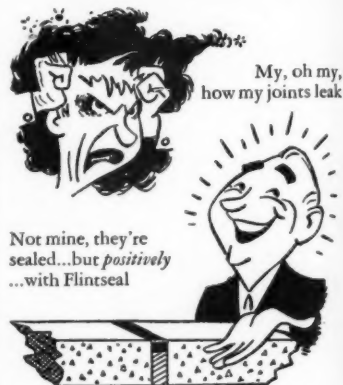
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 136.

Jorgensen Joins NHUC

Roy E. Jorgensen, until recently Chief Engineer for the state of Connecticut, has joined the staff of the National Highway Users Conference as Engineering Counsel. He will have charge of NHUC engineering activities and will advise national and state highway-user groups on problems relating to development of highways, efficient highway use, and sound administrative practices for highway authorities.

He will also be the NHUC liaison with the Bureau of Public Roads and state highway officials.

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Flintseal
Hot-poured
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(Fed. Spec. SS-F-336a)

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CUSENBARY SALES CO.
CUNNINGHAM KANSAS

Portrait in Print

By RAY DAY

Howard L. Way Makes San Bernardino Public Relations His Personal Business

• HOPPING mad, the delegation crowded into the reception room. Gladys P. Finch, Office Manager and Secretary to the San Bernardino, Calif., County Road Commissioner, glanced up and recognized the signs. This one would be tough.

The spokesman for the taxpayer group was a big, burly individual badly in need of a shave. Why in hell, he roared, wasn't that new road in his locality under construction?

No mean appeaser herself, Mrs. Finch explained as tactfully as she could. There wasn't enough money to get that far this year. The job was high on the list, but it would have to wait until...

"Nuts. It's a run-around. Lemme see the head man around here!" shouted the man. His backers muttered an ominous assent.

Quick footsteps sounded from a back office even before Mrs. Finch had time to call. Those same steps had sounded, years before, in many a rough-and-tumble mining camp in the Yukon. A poised, well dressed six-footer stepped up. He was lean and hard at 63. He wasn't smiling. He looked straight into the spokesman's eyes and said evenly, "Hello, Charlie. What do you want?"

The way he said it caused a magic change in the group. The muttering stopped. The spokesman became as meek as a lamb. "Well now, you see, Howard, we don't want to make no trouble, but you can't blame us for wonderin' about that road."

Still unsmiling but not unfriendly, the big white-haired man opened a door. "Come into my office", he said. "I'll show you what I'm up against."

His explanation was short; smashing. It was loaded with fact. It pointed out, off the cuff, that the locality had gotten its fair share of county road improvement. It told how much money was available, and where it came from. When the Commissioner finished, the members of the delegation stammered their thanks and apologized because they hadn't known all the facts. Even the whiskered spokesman grinned and said, "Thanks, Mr. Way".

The man who dominated that taxpayer group by the sheer force of his personality is Howard L. Way, County Surveyor and Road Commissioner of San Bernardino County, Calif. He is also Chief Engineer of the Flood Control District of the biggest county in the United States. Oddly, the man who has this rare gift which commands so much respect wherever he goes is one of the most eloquent exponents of public relations.

"County officials need to give everybody all the information they want", he says. "People always respond favor-

ably when you tell them the truth."

Gift Isn't Synthetic

Way's manner is absolutely genuine. From all appearances, he was born to be a leader. There have been literally hundreds of times when people have come to the office to complain. Mrs. Finch, who spares him as much trouble as possible because he has many other things to do, gives these people a truthful explanation of the matter. Sometimes the people aren't satisfied. They demand to see Way.

When they do, he invariably backs



C. & E. M. Photo

Administrative problems are Howard Way's worst ones. Every day finds him dictating correspondence to Gladys P. Finch, his secretary for 23 years.

Mrs. Finch to the limit. He tells the people exactly the same thing she has told them. There is something in the way he does it that sends them away satisfied.

Twice, at open-forum meetings of county engineers and commissioners, I have seen Way rise to make a motion or give a short explanation of some

(Continued on next page)

A Sunday Punch Every Day in the Week

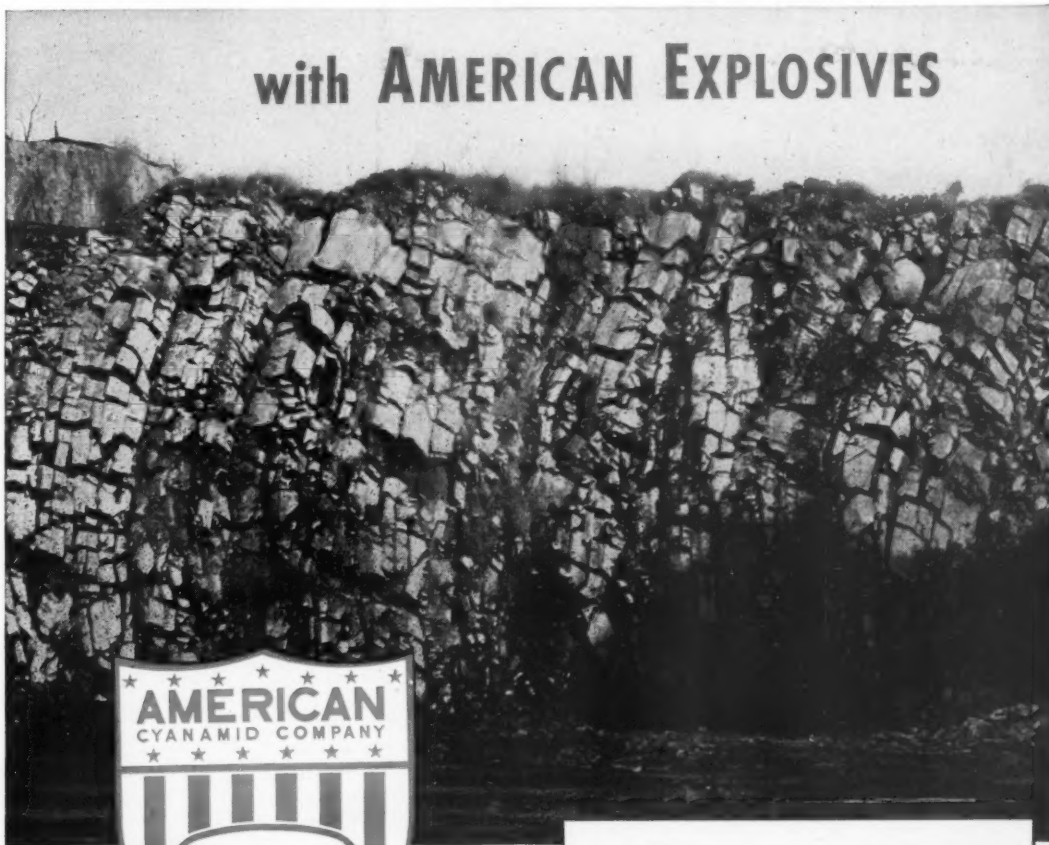
Whether it's moving half a hillside or just blasting a few rocks, you can count on AMERICAN Explosives to produce a shot that brings down the right amount of earth and rock in the right spot. You get these results because every case of AMERICAN Explosives is backed by a combination of intensive research, strict laboratory control and modern methods of production.

AMERICAN Explosives are available in a wide range of strengths, velocities and densities to allow maximum flexibility in your operations. You can get these reliable explosives from district offices and distributing magazines located in key spots throughout the country.

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- All these and many more at a

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Public Relations Is H. L. Way's Business

(Continued from preceding page)

kind. Each time he did so, the murmur and hubbub stopped at once as every delegate strained his ears to hear what Way had to say. No other man, including the speakers, received such undivided attention.

Two things about Way lend themselves to his gift of commanding respect. One, and perhaps the most important, is his absolute familiarity with his job. He has countless details at his fingertips. It is one of his secrets that makes it possible to explain problems to taxpayers. Recently a magazine editor did a wonderful story on San Ber-

nardino County. Way gave him all the information for the story on a 4-hour automobile ride, without once having to refer to his office. His second asset is his distinguished appearance. He looks a great deal like Edward Stettinius. He is always well dressed and well groomed. On the platform, he is a powerful speaker.

He commands attention outside his county, too. He is President of the County Officials Division of ARBA; a member of the Board of Consultants, Bureau of Public Roads; and Chairman of the Highway Committee, Southern Council, California State Chamber of Commerce.

Says Public Relations Vital

The importance of good public rela-

tions between a county official and the people transcends everything else, according to Way. By "public relations" he doesn't mean propaganda, or planted publicity. In fact, though Way's office is elective, he has refused to advertise his campaign the last two elections.

Public relations to Way means the art of keeping everybody satisfied while the best possible job is being done for all. In his case it means getting along with the railroad and truck companies, utilities companies, private citizens, and 250 of his own employees. Sincerity of purpose, straightforwardness, honesty, and thorough knowledge of one's job are the requisites, he believes.

The last thing Way will do as a part of his public relations is to play a favorite. One of his clear-cut road

policies, for example, is that men and equipment cannot work on anything but the county road system. It rules out the usual practice in many a county of grading school grounds, building private roads, and the like.

Not long ago, after Way had turned down several requests from schools for the use of county equipment, an operator called in from a small community. He felt that he should blade the school playground, because for several weeks while working nearby he had parked his motor grader for the night in the school yard. It was the only safe place in the neighborhood. School teachers and pupils had pleaded with the operator.

Torn between justice and his sound policy, Way exclaimed, "Oh . . . thunder! . . . you know that's against our rule!" The operator said that he'd do the grading after hours, on his own time. Way made it plain that he wouldn't authorize it, but if the operator wanted to go ahead on his own responsibility, he wouldn't be out checking.

P. S.: Two days later they had an inter-school baseball series on that freshly graded diamond. "How nice your school ground looks!" exclaimed visitors. "It does, doesn't it," was the answer, and with pride the people from that community added, "The County Road Department did it!"

That one still haunts Way occasionally, but with characteristic good grace he accepted it as one of "our" mistakes.

"He'll never point a finger at an individual for a mistake," explained Mrs. Finch, who like the other 249 employees is intensely loyal to Way. "He just accepts it as one of his occupational hazards and helps us shoulder the blame."

Public relations come easy for Way because he likes San Bernardino County enormously, and has genuine faith in its future. Everything he does is geared to a better future for his county, better service for his people. Recently, when the county was organizing its civilian defense, Way was asked to be Vice Chairman of the San Bernardino County Civilian Defense group. He somehow made room in an already crowded schedule to accept the job enthusiastically.

Public relations also come easy to Way because he is willing to work hard at the job. He is Moderator of the Congregational Church, but many a Sunday morning he will work in his office several hours cleaning up correspondence before church time.

He honestly believes he has the best job in San Bernardino County. Perhaps it is his enthusiasm, his faith, his diligence, his knowledge, or a combination of all, but something makes his grassroots public relations pay off. People respond. They like him enormously. A stranger with an out-of-state license plate on his car could drive up to a desert ranch house, start berating Way to the owner, and he would be lucky to get out of the county without holes in his hide.

Urges Stronger Local Government

State and national government can be sound and strong only if local county and city government is strong, Way believes. He can very nearly prove his point, too. San Bernardino County's population has doubled since 1940. One small community, Fontana, grew from 3,000 to 30,000 in that decade. Not once has the 3,700-mile county road system failed to keep pace.

Strong local government depends on strong local leaders, which brings up a favorite topic of Way's. For people who praise him are told that whatever has been accomplished should be credited to the Board of Supervisors.

"I've served with many supervisors", Way says. "They belonged to all parties, and came from every section of the

(Continued on next page)

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All these blade positions
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● On most construction work—ditching, low and high bank slopes, wide shoulder reach, etc.—the operator of an Adams Motor Grader quickly and easily obtains all necessary blade positions through convenient cab controls—without mechanical adjustments. Only occasional work, calling for extreme reach, requires operator to shift blade on circle or change lift linkage.

The ability of Adams Motor Graders to provide this wide range of blade positions—without mechanical adjustments—is one of the big reasons why they are the fastest, most efficient and economical graders on the market. Ask your local Adams dealer for complete information.

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county. Sometimes our views differed, but we were always able to get a sound solution because San Bernardino County supervisors without exception, have been big men with broad vision for the future."

If Way would offer advice to the average county engineer, it would come in this capsule: be honest, be objective, be enthusiastic, study to stay ahead of the times, don't play favorites, and spend your road money as wisely as you can. Way spreads his \$2,600,000 annual budget over the entire county, hires people from every part of the county so they can all work close to home, and accounts for every penny he spends.

Nowhere does his public-relation concept show to better advantage than in his relations with his employees. Recently he fronted for the group in a salary-increase plea to the Board of Supervisors. He first studied the request, talked it over with everyone, and when he presented it, it was granted. Once a month all road department employees gather at the county garage. They serve coffee and refreshments, visit, talk shop, discuss accident prevention, and generally get acquainted. As a result, that group is a close-knit integrated organization up-to-the-minute on maintenance and construction techniques.

Although Way's office routine keeps him chained in San Bernardino much of the time, he isn't a desk-type engineer. He is out as much as possible, and maintains exceptionally close contact with the field through his two road superintendents, Willard Carris and Ward Addis. The centralized control of the county makes it easier for him to keep in touch than if the county were decentralized.

One of Way's strong convictions is that county road engineering needs more locally applied intelligence. Hard-and-fast rules simply cannot be applied to every county organization for the simple reason that county organizations differ. Topography, the engineering organization, availability of materials and equipment are seldom the same in two counties.

A case in point is the problem of contract system versus force account. Way believes that a county with no equipment pool would be foolish to spend most of a new appropriation on its own equipment, and could get its roads faster by contract. By the same token, a county which has built up valuable



C. & E. M. Photo

San Bernardino County Road Commissioner Howard L. Way stands in the center of the picture. The other five men are the Board of Supervisors: standing beside Way, Howard Holcomb; seated, left to right, H. George Cunningham, Chairman Frank H. Mogie, and Will R. Mason; standing at the right is S. Wesley Break.

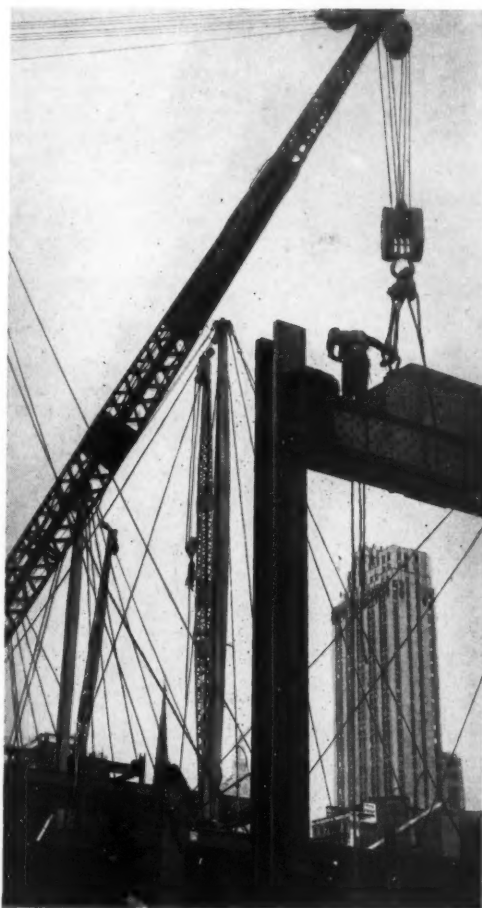
equipment and personnel over the years would be foolish to junk it all and go in 100 per cent for the contract method.

He explains it this way. "Everybody knows there is a place for contract work. Every highway administrator has the responsibility of determining where to draw the line between contract jobs and building with his own organization. All of San Bernardino County's Federal-Aid secondary projects have been let to contract. But ours is a large-scale operation. We have built up equipment and experienced forces for over 35 years, and we know what we can do with it. When you have the equipment we own, you can move in and do a job.

"When we do a piece of work with our own forces, we avoid the cost of advertising and letting the job, and we make a big saving in the cost of engineering. Much of our work is of such a character that we can do it ourselves with only sketchy plans. Many of our jobs are finished and forgotten when

(Continued on next page)

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FOR EASY HANDLING, extra toughness and service life, there's nothing like Roebbling Preformed "Blue Center" Steel Wire Rope. "Blue Center" steel—made only by Roebbling—gives rope top resistance to abrasion and fatigue. And Roebbling Preforming gives you a rope that spools better... doesn't tend to set or kink... minimizes vibration and whipping.

There is a Roebbling wire rope of the right construction, grade and size for every type and make of rope-rigged equipment. Have your Roebbling Field man help choose the rope that will give you the best and the lowest-cost performance. Still further savings may be effected by following his suggestions about the proper installation, use and maintenance of wire rope. John A. Roebbling's Sons Company, Trenton 2, New Jersey.

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Public Relations Is H. L. Way's Business

(Continued from preceding page)

we would still be running levels if the work were handled by contract.

"Our policy of doing the work ourselves when we can do it cheaper is saving us money. It is keeping more money inside the county to be spent at home. And we aren't fooling ourselves a nickel, because we know our costs."

Mining Engineer by Education

Way was born in Nebraska in 1887, but he doesn't remember much about the Great Plains because his parents moved to Whittier, Calif., when he was three years old. He received his early education at Whittier elementary schools, and soon became interested in engineering. In his spare time he began to hang out around the Whittier City Engineer's office. By the time he was through the eighth grade, he had begun to work in summer vacations as rod-

man, chainman, and finally as instrument man. When he had finished high school, he was already a fair surveyor.

He took two years of advanced work, slanted toward mining engineering, at the University of California, and then, because of circumstances, called formal schooling quits and began his career. A copper mine near Globe, Ariz., needed a good underground surveyor, and Way got the job.

But the far north beckoned with a better offer, and soon he was up in Whitehorse, Yukon Territory. An iron-mining syndicate was opening up a new development. The management liked Way's engineering very much, and the inducement to stay was strong. But he managed to get away long enough to return to California, where he and his childhood sweetheart were married. They returned almost immediately to Whitehorse.

Later, before the first of three children was born, the Ways returned to the States, for the simple reason that the Yukon was too rugged a place to

raise a family. Way worked as a mining engineer with the Bunker Hill & Sullivan interests in Idaho's Coeur d'Alene district before returning permanently to California.

On January 1, 1915, he landed a job in the San Bernardino County Surveyor's office. World War I soon began to focus attention on highway transport problems. In 1923 Way had risen to the post of County Surveyor, a position he still holds. In 1937 the Board of Supervisors combined the office of highway commissioner with that of county surveyor, and Way has held the dual post ever since.

Over the years, Way has watched the county road system grow from the first rutted trails across the desert to the present-day ribbons of asphalt and concrete which reach every inhabited part of the county. You would think that at this stage of the game Way would be satisfied to rest on his accomplishments. But that is the thing farthest from his mind.

The pounding of present-day traffic has posed the problem of raising the standard of most of the roads in San Bernardino County's southwest corner. That is the part of the gigantic 20,160-square-mile county which has most of the population. Maintenance and construction work is under way constantly in the San Bernardino area.

Improvement and maintenance of county roads in the Lake Arrowhead, Bera Valley, and mountain resort area has also been a problem, especially since snows 8 to 10 feet deep want to pile up at a time when the roads are cluttered with skiers. The county is so large that desert heat, flash floods, and snowstorms can occur simultaneously. Mountain fill slopes present a problem in erosion, and just to keep things interesting, the depletion of organic content in the orange groves lets much of the chemical fertilizer leach out to roadside ditches, so the weed problem is terrific.

Way and his crews are solving it all with the best methods and a tremendous 400-piece equipment pool. That pool includes such items as 3 rotary snowplows, 200 trucks, 20 tractors, 12 bulldozers, 5 scrapers, 13 tractor-mounted loaders, 30 motor graders, 28 pullgraders, 8 power shovels, 7 rollers, 7 compressors, 4 oil-processing units, 16 concrete mixers, and 4 power mowers.

Today, with even the best of modern transportation, the San Bernardino

County job is a big one. In area the county exceeds the total combined areas of New Jersey, Delaware, Massachusetts, and Rhode Island. A crack Santa Fe train leaves San Bernardino at 2 p. m. Not until 7:40 p. m. does it reach the Colorado River, the county's eastern boundary. Imagine the highway network in that vast expanse of territory.

Way takes it all in stride, without ever getting excited or ruffled. In late years the work has been pouring on his shoulders even more heavily than usual—so much so that a supreme example has been created of the man's ability to command harmony.

A few weeks ago, Way decided he
(Concluded on next page)

CONTRACTORS NOW RECOMMEND THE TRAFFICONE SYSTEM AS THE LOWEST COST METHOD OF PROVIDING ABSOLUTE PROTECTION FOR WORKERS, EQUIPMENT AND THE PUBLIC



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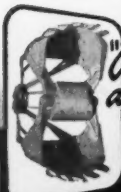


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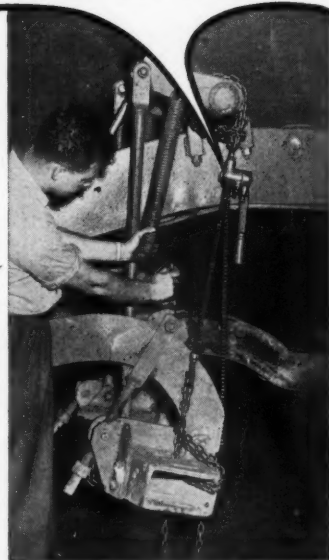
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must make a rather long and strenuous trip to attend a meeting. Concerned about his work overload, Mrs. Way tried to talk him out of the trip. She could get nowhere. "I've simply got to go", Way said. "I've promised I would."

Next day Way received more than usual persuasion against the trip from Mrs. Finch in the office. She didn't get anywhere either.

If Way had any idea that open collusion existed between his wife and his secretary, he kept it prudently to himself. A man who is a natural-born leader and an all-around good fellow to the point where his wife and his secretary would worry together about his welfare . . . well! He'd keep that to himself and go on and run his road department. Which is exactly what Way did, after he got back from the trip.

Private Firms Build Homes at Fort Bragg

When the Army begins an expansion program, one of its biggest headaches is the housing of servicemen's families. During the last Congress, Senator Wherry of Nebraska sponsored a bill which is helping to solve this problem.

The bill allows private firms to build houses on Government land rented under long-term leases. The houses are rented to military personnel, or to civilians if there are not enough takers among the military. This last provision is an anchor to windward for the private investor in the unlikely event that the Army should suddenly shrink in size.

Mallonee Village at Fort Bragg, N. C., is one of several projects being built



V Corps Public Information Office Photo

A part of the \$10,000,000 Mallonee Village at Fort Bragg, N. C. The completed project has 1,000 dwelling units which could house servicemen's families.

under the provisions of this bill. Two firms, T. A. Loveing & Co. of Goldsboro, and W. H. Weaver Construction Co. of Greensboro, pooled their efforts to handle this \$10,000,000 job, the biggest housing project in North Carolina's history. Together they form the Loveing-Weaver Co.

The job was begun on May 1, 1950, and completed this spring. It covers 300 acres, with 5 miles of new roads. The 600 garden-type apartments and 400 individual houses included in the job have plywood roof sheeting and plywood subfloors. Interiors are of dry-wall construction with sheet rock supplied by U. S. Gypsum. A shopping center and an automobile service station are part of the project.

Mallonee Village is named in honor of Col. Richard C. Mallonee, Deputy Post Commander at Fort Bragg. Operating personnel for Loveing-Weaver Co. were John D. Thomas, Project Manager; C. D. Smithey, General Super-

intendent; George Goodwin, Utilities Superintendent; and John Young, Landscape Foreman.

Protective Pipeline Wrap

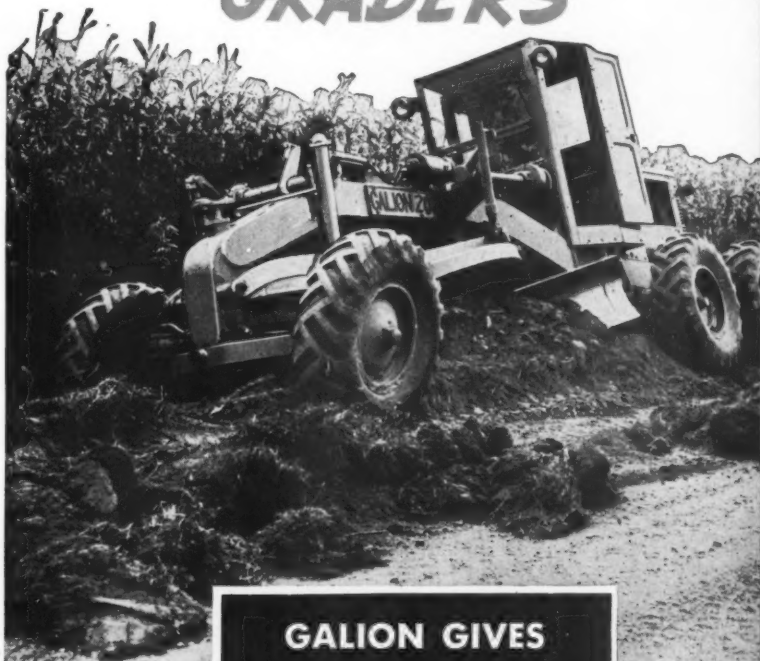
A bulletin is available on new corrosion-protection wraps engineered for pipelines by Owens-Corning Fiberglas Corp., Toledo 1, Ohio. The company's products include parallel reinforced Coromat inner wrap, a new pipeline outer wrap, and a pipeline rock shield. The booklet outlines the characteristics of the products and indicates their application in solving pipeline corrosion problems.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 129.

Air Reduction V. P.

J. D. Gunther, Secretary of Air Reduction Co., Inc., since 1946, has been elected a vice president. T. Stanley O'Brien III succeeds him as Secretary.

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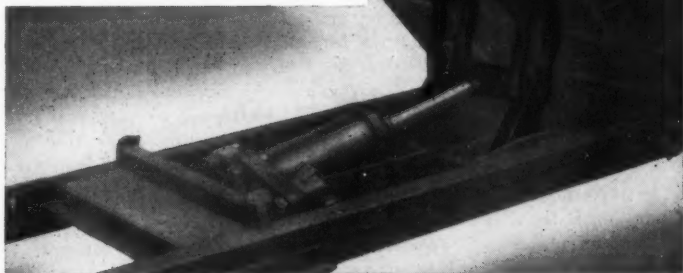
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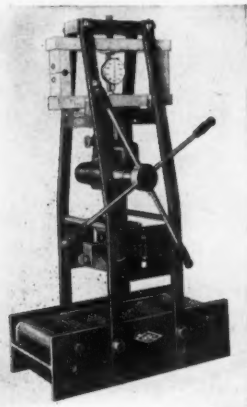
Consequently, MARION Hoists actually do their job easier—hydraulic systems last longer, are more efficient and dependable, and, in the long run, more economical to own and operate.

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American Instrument Co. makes this concrete-beam tester which has a maximum flexural-strength capacity of 1,250 psi.

Concrete-Beam Tester

A new concrete-beam tester has been announced by American Instrument Co., Inc., 8010 Georgia Ave., Silver Spring, Md. It determines, by direct reading, the flexural strength of concrete-beam specimens having a cross section of 6 x 6 inches and sufficient length to permit testing on an 18-inch span, the company says.

One division (1/100 revolution) on the dial of the gage indicates an applied load of 120 pounds which corresponds to a flexural strength (modulus of rupture) of 10 psi. When the width or depth of the specimen beam varies from the nominal 6 x 6 inches by more than 0.05 inch, a correction factor must be applied. The machine has a maximum flexural-strength capacity of 1,250 psi (15,000-pound load). It is separable into three parts weighing 90, 70, and 35 pounds.

The molds for casting the 6 x 6 x 21 and 6 x 6 x 36-inch specimens for 18-inch-span third-point loading tests can be collapsed for transportation; they are available from the manufacturer.

Further information may be secured from the company by requesting Bulletin 2191. Or use the Request Card at page 16. Circle No. 155.

Koppers Ups Bausman

Cooke Bausman, Jr., is now Manager of the Sales Department, Central Staff, Koppers Co., Inc., Pittsburgh. He joined

Koppers in 1948 as Assistant Manager of the Sales Department and since last November has been Acting Manager of the department.

New Tractor-Shovel With Crawler Tracks

A new development in track-type tractor-shovels has been announced by Frank G. Hough Co., 822 Seventh Ave., Libertyville, Ill. The basic and significant feature of this machine is the fact that it is a completely integrated track-type tractor and shovel, rather than a front-end attachment for a conventional crawler tractor.

The engine is mounted on the rear to provide maximum balance and stability; the operator is located high and forward where he has full visibility; and there is a special full-reversing transmission that provides 4 forward speeds and 4 reverse speeds. Forward-reverse or directional shift is separate from the regular shift and is said to



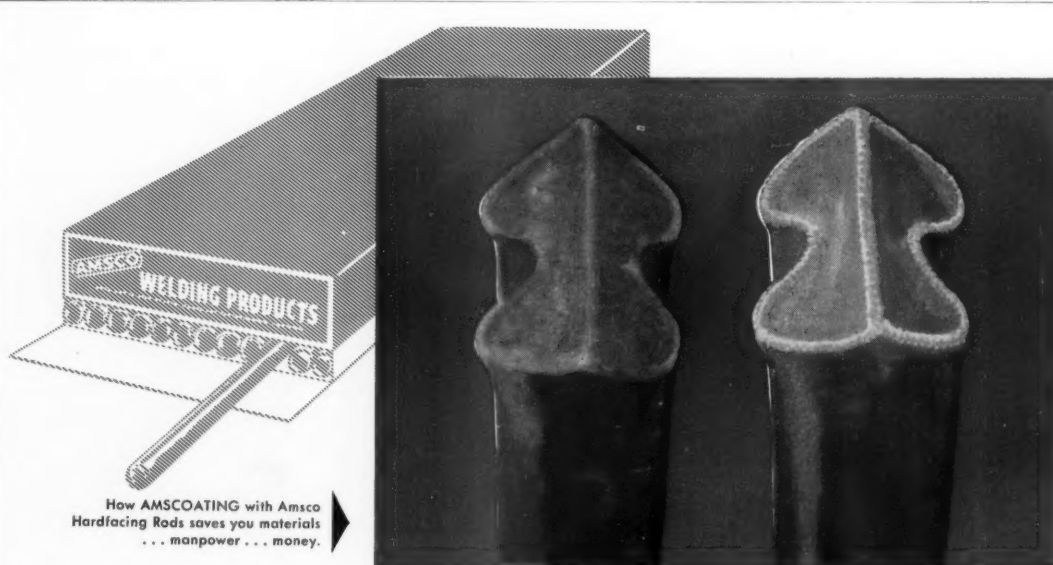
Hough's new Payloader is an integrated track-type tractor and shovel. It has 4 forward and 4 reverse speeds.

be quick and easy-acting.

The balance inherent in its design, plus the several fast reverse speeds, makes this new crawler tractor-shovel extremely fast-operating, the company says. Bucket capacity is one cubic yard. Boom arms and bucket dump are each

controlled by a pair of double-acting hydraulic rams. The new unit may be powered by a 67-hp gasoline or diesel engine.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 157.



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Hardfacing rods—and recommendations for their use—are as sound as the manufacturer who makes them. AMSCO has been fighting wear for a half-century—first with Manganese Steel, and later with AMSCO Hardfacing Products.

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AMSCOATING saves you money in terms of lower maintenance costs, less down-time... more production. The actual on-the-job example cited above is one of the many applications that prove it! Write today for illustrated catalog describing dollar-saving AMSCO rods... and the name of your nearest AMSCO distributor.



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Roadside Development Meetings in La., Ohio

Short Courses Brief Highway and Landscape Engineers on Objectives and Techniques

• TWO conferences on roadside development were held the first week in April. One was the Tenth Annual Short Course on Roadside Development, sponsored by Ohio State University and the Ohio Department of Highways, and held in Columbus, Ohio. The other was the Second Short Course Conference on Roadside Development at Baton Rouge, La. This was sponsored by the Louisiana Department of Highways and Louisiana State University, College of Engineering and General Extension Division.

Louisiana State Parks Commission. First speaker was George B. Gordon, Landscape Architect, Bureau of Public Roads, Washington, D. C. He discussed parking turnouts and rest areas, pointing out that though we have made great progress in providing highways for traveling vehicles, we have not made sufficient provision for standing vehicles. Places to park and rest are an essential part of our highways. Factors in the selection of such sites, he said, are accessibility, satisfactory natural

(Continued on next page)

Louisiana Program

Louisiana's Second Short Course was attended by 122—highway engineers from the Louisiana Department of Highways and neighboring states, and from the Bureau of Public Roads; members of the University; and representatives of the State Federation of Women's Clubs, the State Federation of Garden Clubs, the State Parks Commission, and Parish representatives. Two days were devoted to papers and discussions, and two to an inspection and field trip.

Professor H. A. Flanakin, Acting Director of the Engineering Experiment Station, L. S. U., opened the course by stating its purpose—to carry forward from year to year education in the best roadside development procedures. A. E. Holmes, Landscape Engineer of the Mississippi Highway Department, presided at the first session. He said that the presence of so many highway engineers proved that roadside development now has a definite function in highway construction and maintenance.

R. B. Richardson, Director, Louisiana Department of Highways, was the first speaker. "It behooves those who are the builders of our highways", he said, "to look into every phase of highway endeavor, to determine the worthwhile measures which should be included in highway programs in order that safety, economy, and usefulness may result. Why roadside development should be done is no longer a question. Since its inception some 20 years ago, we have been able to judge by actual experience what phases of it are best..." He outlined some of these important phases—erosion control, proper drainage, sodding or seeding, conservation, plantings for traffic guidance, screening, turnouts, and rest areas. He concluded: "I wish to mention another subject, a very important phase of roadside development—good maintenance. It is a part of roadside development, just as construction is a part. Roadside development is not finished when the construction contract is completed. In reality, the future results of it are just beginning."

Bill Andrews, Urban Design Engineer, Division 6, U. S. Bureau of Public Roads, Fort Worth, Texas, discussed safety in roadside design and showed color slides illustrating proper design for medians, crossovers, and turnouts. Final speaker at the first session was Harold E. Olson, Roadside Development Engineer, Minnesota Department of Highways. Mr. Olson described his state's progress, particularly in turnouts, parks, and historical sites. He showed slides depicting such areas, and discussed selective thinning of trees along the highways to provide better views of Minnesota's many lakes and other natural features.

Presiding at the afternoon session was W. W. Wells, Assistant Director,

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These three U.S. Giant Conveyor Belts have been carrying the plant's output for 5 consecutive years.

This is the main conveyor belt, 1400 feet long. It carries the stone from the stock pile to shipping point.

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Roadside Development Meetings in La., Ohio

(Continued from preceding page)

drainage, distance from towns, presence or absence of shade, available water supply, possible interference with adjoining land use, safety, and low maintenance cost.

"Public Relations and Roadside Development" was the subject of the next paper. Prepared by Olive E. Potter of CONTRACTORS AND ENGINEERS MONTHLY, who was unable to attend the meeting, it was read by Mrs. Torbert Slack. Miss Potter defined public relations as "a continuing process to obtain good will and understanding; inwardly through self-analysis and correction; outwardly through all means of expression." She stressed the education job still to be done to convince people of the contribution of roadside development to the highway program, and pointed out that perhaps no other phase of highway work can do so much to engender public good will and recognition of a highway department's efforts as good roadside development. She said in conclusion: "Favorable public opinion and confidence, won by sound, honest, efficient work, maintained by continuing effort and a well planned effective program of public information, means good public relations. Earn it, cultivate it, use it; it is a highway department's greatest asset and the only means to the highway system we need and must have—in war or peace."

Public assistance in roadside maintenance was covered by W. H. Huckabee, Louisiana's Maintenance Engineer. He presented some cost figures, showing the expense of cleaning up the debris and litter left along the roadsides by the thoughtless public. But he said he felt sure that public cooperation and support of a program for neater roadsides, with less expense to the highway department, can be secured.

Technical papers by personnel of the State University were presented on the morning of the second day. Dr. Clair A. Brown, Professor of Botany, who has done a good deal of experimental work in weed control, stressed the care which must be used in applying chemicals in agricultural areas. He suggested the use of borax, in dry or spray form, for keeping guardrail and other areas which are difficult to mow free of growth.

Dr. M. B. Sturgis, Head of Agronomy at the University, described the soil in the region and the fertilizer amendments which could increase its fertility. He discussed commercial fertilizers, their characteristics and application.

Several native grasses are suitable for highway work in Louisiana, R. A. Wasson, University Agronomist, told the group, but the most important ones are Bermuda and carpet grass. He described the use of Alta and Kentucky 31 fescues, principally on eroded areas.

The concluding session was a panel discussion by all those participating in the program, presided over by Torbert Slack, Louisiana Roadside Development Engineer. A question box had been provided during all the sessions, and many questions from it were put to the panel.

R. B. Richardson, Louisiana Director of Highways, was Chairman of the Over-All Planning Committee, and the Program Committee was composed of Torbert Slack, Chairman; H. A. Flanagan, of L. S. U.; J. S. Logan, District Engineer, Bureau of Public Roads; E. B. Doran, Head, Department of Agricultural Engineering, and J. W. Brouillette, Director, General Extension Division, L. S. U.

Ohio Meeting

Ten years of advancement in roadside development was the theme of the

Annual Short Course in Columbus. One panel discussion reviewed the advancement in erosion control by seeding, in the use of woody plants, and in the use of ground cover, in chemicals and equipment for weed control, and in the construction and maintenance of roadside parks.

Other subjects covered roadside development in the conservation program, Ohio's first parkway, utility-line maintenance, design of intersections, the advance in highway cross-section design, and roadside development as it affects highway maintenance, maintenance on new construction, and as viewed by the landscape architect.

As usual, the proceedings of the sessions will be published later in the year.

Dupre, Dinner Speaker

Dallas D. Dupre, Jr., former Landscape Architect of the Ohio Department of Highways and one of the initiators of the Ohio Short Course, was the speaker at the annual banquet.

Mr. Dupre took a look backward over sixteen years of roadside development and a look ahead at its future role. He admitted that landscape engineers, like other engineers, have made mistakes in roadside development's short life of some 20 years, but said "Let's profit from those experiences and go on from here".

He pointed with pride to the progress of roadside development. He traced this

progress through subjects introduced in successive meetings of the Short Course—better highway administration, relationships between good highway engineering and roadside development, more cooperation in construction and maintenance, the development of machines for roadside work, the use of chemicals. He cited comments of authorities in the highway and other

(Continued on next page)



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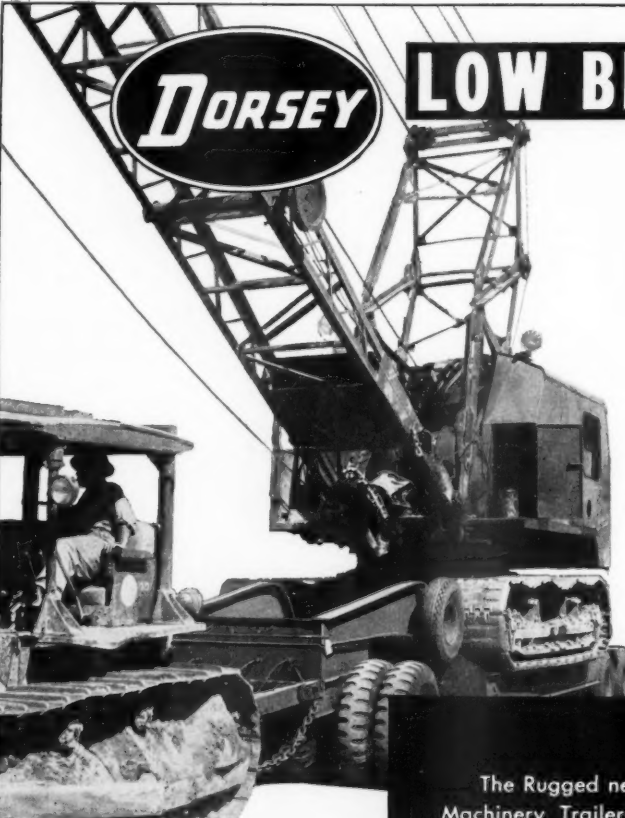
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fields as evidence of the value of roadside development and the ever-increasing recognition of the need to preserve or create landscape features along our highways. But he urged a broader program in each state, and he raised this question: are highway departments and legislators catering to big business—truckers, gas stations, outdoor advertisers, etc.—rather than to the desires and needs of the really big taxpayers, the public?

Roadside development engineers, Mr. Dupre said, can stand on their record but should not rest on their laurels. "Too many of us", he said, "stay too close to the ground. . . . One needs to climb to the heights to see not only the heights but the pitfalls and depths. And you landscape architects know there are many pitfalls and problems in the work you are doing. So why not climb up?"

Dupre Park Dedicated

A feature of the Columbus meeting was the dedication of the Dupre Roadside Park, honoring Dallas D. Dupre for his years of service to Ohio in the development of its roadside park system. The park, Ohio's 281st, is on U. S. 23, just north of Worthington, near the area in which Mr. Dupre spent his boyhood and now resides. A bronze plaque commemorating the occasion was presented to Mr. Dupre. It will be placed on the well shelter in the park.

Principal address at the dedication was given by Don Strouse, conservation writer for the Scripps-Howard newspapers in Ohio. Mr. Strouse reviewed the history of roadside parks in Ohio—its first one was built in 1936. In fifteen years, more than 300 have been built. Though some of them had to be abandoned, there are now 281 in use. "They have won praise in national magazines", he said, "and the files bulge with letters of appreciation from all over the land".

"Perhaps in the years to come", Strouse concluded, "some of the 8,000,000 people who stop in these parks every year will pause before the bronze marker to thank the man who contributed as much as any other to the safety and pleasure of driving on Ohio highways—Dallas D. Dupre, Jr."

Following the address, an Ohio buckeye tree was planted. Representatives from sixteen states, Ontario, and Washington, D. C., who were attending the conference, each placed a spadeful of soil around the roots of the tree.



At the ceremonies dedicating the Dupre Roadside Park in Ohio, Dallas D. Dupre, Jr., (center) receives the bronze plaque to be placed on the well shelter from W. J. Garmhausen, Chief Landscape Architect, Ohio Department of Highways. T. J. Kauer, Director of the Ohio Department (at left) looks on.

Roadside Development

The papers given at the Short Course in Roadside Development sponsored by the Department of Agriculture, University of Wisconsin, and The Wisconsin Roadside Council, November 9-10, 1950, are available in booklet form. These papers cover various aspects of roadside development with particular emphasis on the problems peculiar to Division 5A, North, which includes the states of North and South Dakota, Minnesota, and Wisconsin.

Copies of this booklet may be obtained by writing to Russell L. Williams, State Highway Department, State Capitol, Madison, Wis. There's no charge for the booklet.

Hyster Promotes Stiegele

Richard E. Stiegele is now Sales Manager for the Eastern Tractor Equipment Sales Division of Hyster Co., Portland, Oreg., with headquarters in Peoria, Ill.

"Hydrocrane Great for Close-Quarter Digging"

Says Wisconsin Contractor

"With my H-2 Hydrocrane I can handle jobs other fellows can't begin to do," says Bill Johnvin, Mountain, Wis., contractor. "It's great for close-quarter digging, especially under overhanging branches. And I run into

a lot of this while excavating basements and putting in septic tanks for folks building homes out in the woods."

Johnvin excavates about 50 basements yearly, ranging in size from 24 x 24 to 50 x 50 ft., and handles an equal number of septic tank jobs. He has put in as many as three septic tanks a day. This includes digging tank pit, about 70 ft. of trench, and a hole for the dry well — plus setting the tank. Other jobs include loading logs and pulp wood, digging trout ponds and silo pits, and even digging graves.

This contractor says that his Hydrocrane paid for itself in the first year and a half of service, in addition to giving him a fair living.

Two Hydrocrane sizes— $\frac{1}{4}$ -yd. 2-ton, $\frac{3}{8}$ -yd. 3-ton. Available with clamshell, crane hook, grapple, magnet, bulk materials bucket and catch basin cleaner. Send coupon for full details.



Working in a heavily wooded section, Bill Johnvin's Hydrocrane widens and deepens a section of trout stream to make a pond. The telescopic boom and independent boom hoist combination is a real asset in this close quarter digging.

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HYDROCRANE DIVISION**
South Milwaukee, Wisconsin

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This is the new gasoline-powered Creeper concrete saw. It can cut about 5 inches deep. There is also an electric-powered Creeper.

A New Concrete Saw

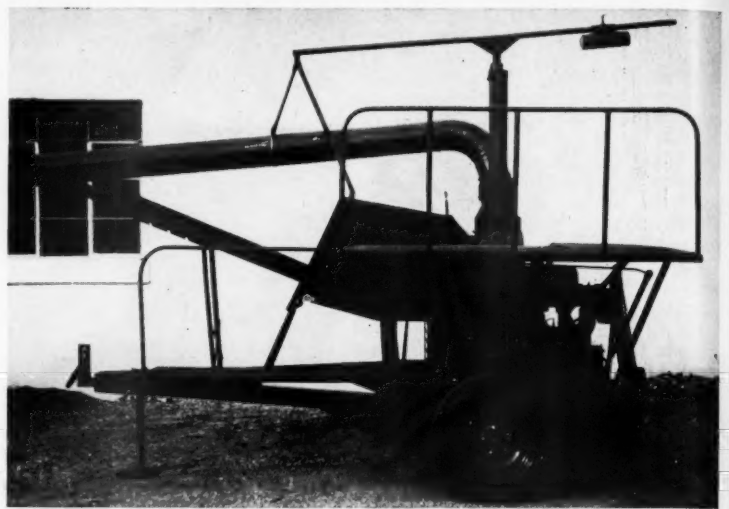
A new gasoline-powered concrete cutter has been developed by Martin Fireproofing Corp., 2200 Military Road, Buffalo 17, N. Y. The Creeper features

the guided-rail principle, has a maximum blade capacity of 14 inches and a hose attachment for wet cutting, and is completely portable. The gasoline engine makes it independent of external power sources. It cuts to depths of approximately 5 inches and may be used with diamond blades or blades of specially bonded abrasive where dust suppression is required. Abrasive blades are also available for dry cutting of all types of concrete, asphalt, or masonry.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 171.

Two Salesmen for Atlas

The Atlas Mineral Products Co. of Houston, Texas, and Mertztown, Pa., has appointed two salesmen in the Los Angeles area. Ray Oster is handling the sale of corrosion-resistant cements and Hugh G. Lawson is in charge of jointing materials for water and sewer pipe.



Two bales of straw per minute is the capacity of the Finn mulch spreader and the material can be blown 50 to 60 feet. Total weight of the spreader is 3,260 pounds. The machine may be used for spreading on fills as well as on embankments.

New Mulch Spreader

A mulch spreader for roadside development has been announced by Finn Equipment Co., 2525 Duck Creek Road, Cincinnati 8, Ohio. It is mounted on a pneumatic-tired assembly with a trailer hitch for towing by truck, and is designed to handle two bales of straw per minute. The high-velocity air is said to carry material 50 to 60 feet with an even distribution.

The Finn spreader is powered by a Continental Y 112 or Wisconsin VP-4 engine, with electric starting as standard equipment. The blower fan on the spreader is 36 inches in diameter. The discharge pipe is 10 feet x 8 inches. Total weight of the spreader is 3,260 pounds. The machine may be used for spreading on fills as well as embankments.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 173.

Laboratory Safety Manual

A newly revised edition of the 40-page booklet entitled "Manual of Laboratory Safety" is now available from Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa. Designed to implement a complete laboratory safety program, it covers accident prevention,

first aid, fire prevention, and safety equipment.

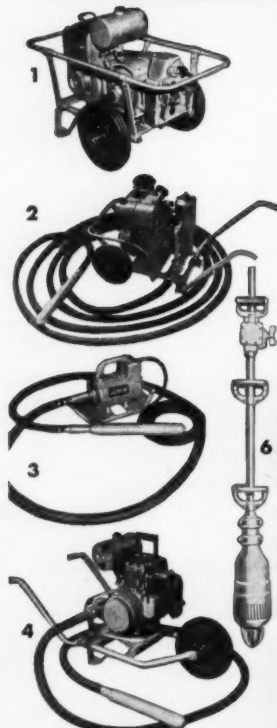
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 146.

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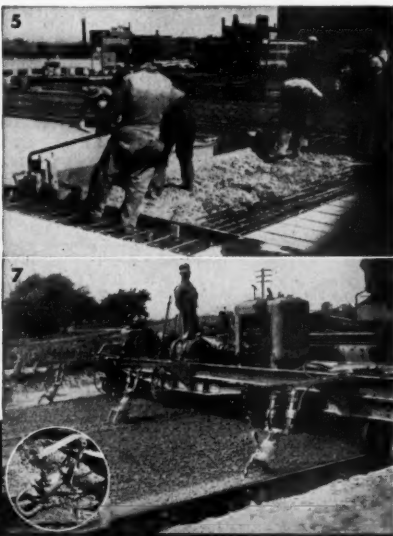
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Specified densities are quickly reached in granular soils with the Jackson Vibratory Soil Compactor. For those areas adjacent to structures, bridges, culverts, in trenches, factory floors and earth fill dam construction, there is nothing that begins to equal the Jackson Compactor for speed, convenience, and thoroughness of compaction. Self-propelling, the operator merely guides it. Send us a sieve analysis or small sample of the soil, and we will tell you what you can expect in percentage of A.S.S.H.O. densities and depth of compaction.

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1. Power Plant used with Compactor and Screed, 1.25 KVA. Others of 2.5 and 5 KVA capacity — all produce both single and 3-phase 110 V. 60 cycle AC and have generators requiring no maintenance or adjustment.
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7. Sideform Vibrator — mounts on finisher, saves better part of two men's labor. Write for "Pocket Guide" describing the entire line.



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Spring Months Vital To Kansas Highways

Maintenance Engineer Says Prompt Attention to Base and Surface of Bituminous Roads Keeps Them Paying Their Way

• LOW-TYPE bituminous roads will serve modern traffic, and do it fairly well, if vital maintenance work can be done in early spring between the last thaw and the first heavy rain.

So says L. J. Siler, Engineer of Maintenance of the Kansas State Highway Commission at Topeka. For several years now Siler has been in the Maintenance Bureau, first as assistant and lately as the head, and prior to that time he was in the Salina Division. He has watched the changeover in Kansas from dirt to gravel to low-type bituminous construction, and finally to the higher types of asphaltic and portland-cement concrete. He firmly believes that

though the maintenance costs are considerably higher, the low-type asphalt surfaces pay for themselves in the convenience they render to traffic, and despite tricky subgrades and bad drainage, he says they can be maintained.

There are 3,564.3 miles of such construction in Kansas at present, and the number of miles is increasing every year as the State takes the remaining gravel and unimproved mileage out of circulation by replacing it with asphalt. Kansas has never been too well supplied with highway money, but the demand for dust-free all-weather surfaces forced the Highway Commission over the years to build the low-type bituminous surfaces.

In many cases—most cases, in fact—these highways consisted primarily of a graded roadway, often substandard, with no base except the old gravel roadbed. The old roadbed was shaped and smoothed and treated with light asphalt followed by a heavier asphalt seal with cover aggregate. Some of the surfaces were added to and built up as the years passed, but in many cases the subgrades were not corrected or strengthened.

Naturally, the improved highways drew modern traffic, and today's modern trucks loaded to Kansas legal limits of 18,000 pounds per axle are taking a terrific toll, especially in the spring season when the frost leaves the ground. Kansas is an agricultural state. Its soils are not too high in bearing value, even when well compacted. Gravel deposits and crushed rock are becoming harder to find. If the low-type bituminous highways are left exposed during the vital period in the spring, therefore, they reach a critical point where complete reconstruction is practically necessary.

Solved by Maintenance

According to Siler, the average service life of such a road under modern traffic is about 10 years, and prompt



C. & E. M. Photo

For several years, L. J. Siler has been in the Maintenance Bureau at Topeka, Kans.—first as assistant and lately as head.

scheduling of maintenance—betterment work at intervals approximating 10 years will keep most of the lower-type roads in service.

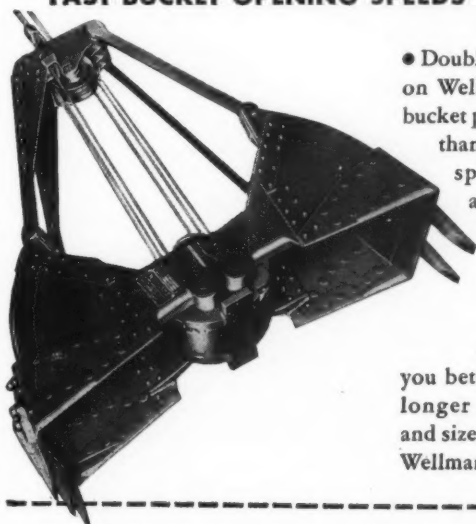
"Of course, many sections are badly

drained, and we have to build better drainage in these spots, either with French drains, tile, or embankment additions", he explained.

(Concluded on next page)

WELLMAN Williams Type

FAST BUCKET OPENING SPEEDS OPERATIONS



• Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

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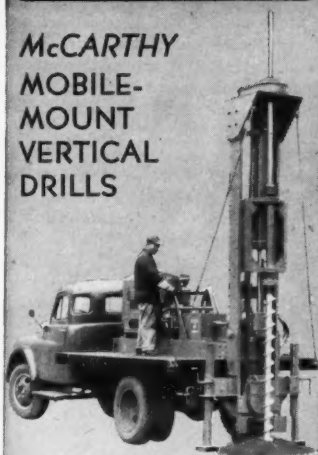
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• You're set to drill all ordinary rock formations when you're equipped with mobile-mounted McCarthy Vertical Drills. These heavy, rugged McCarthy units are compactly designed for truck, half-track, cat or "Jumbo" mountings. They're easy to move about, easy to set up. They're equipped with finger-tip hydraulic controls; your choice of electric, diesel or gasoline power units.

Recently, on one difficult job, workers using McCarthy equipment drilled an 8-inch hole 100 feet deep in only 40 minutes!

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SINCE 1901**



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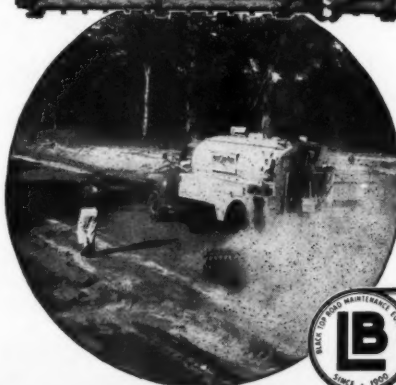
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This "Spray Master" Pressure Distributor with the New Circulating "Lite-Wate" Spray Bar gives Contractors and Highway Departments the most efficient, low cost operating Unit ever devised.

The "Spray Master" operates with the minimum of labor, heats faster, has only one Valve for starting and stopping the spray.

This new "Lite-Wate" Circulating Spray Bar is less than 1/2 the weight of ordinary spray bars. It has quick acting couplings for adding extensions up to 24 ft. in width. Each nozzle can be turned off individually to give any desired spraying width. The "Lite-Wate" Circulating Bar is the latest in engineering achievements by Littleford.



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101 Utility Spray Units—Tar Kettles—Asphalt Tools
"Tanker" Heaters—Road Brooms—Supply Tanks

Spring Months Vital To Kansas Highways

(Continued from preceding page)

"When our asphalt roads begin to shove, buckle, and go to pieces in the spring, each division moves its men and machines in and works as rapidly as possible when days are windy and sunny. Motor graders scarify and windrow the old bituminous mat. It used to be that we could save this and leave the base for weeks or months, but we can't do that now; our people won't stand for it. We aerate, scarify, re-aerate, and re-lay and recompact the base just as soon as we can dig it up and dry it out.

"We always try to make minor local improvement each time we rip up a section. Sometimes we add more gravel. Sometimes we improve the drainage. Sometimes we add more oil, if the base material is granular, and road-mix a thicker mat. If the weather is good and our maintenance crews are all busy, we



C. & E. M. Photo

An Adams motor grader spreads sand over a fresh oil blanket. This is a typical spring maintenance trick in Kansas to make highways smoother.

don't hesitate to let this type of work out by contract."

Since most of the mileage is programmed on a time basis according to inspections of the road condition, Siler's men have a reasonably good idea of what mileage there will be to im-

prove each spring. Unpredictable factors which make the situation better or worse include good or bad weather, shallow or deep frost during the winter, and so on. Last winter Kansas had a reasonably mild run of weather, with not too much snow. The reconstruction job this past spring was lighter as a consequence.

If reconstruction is impossible within the limits of time and money, maintenance men then do the next-best thing. They rip out the broken asphalt, dig the base out and replace it if necessary, and patch the local areas with cold premix. Low-type bituminous highways in Kansas have a tendency to break first at the edges, and the local repair of many miles of this edge break is high on the spring priority in every Kansas maintenance division.

Seemingly desperate, always smacking of dire emergency, this type of maintenance is working satisfactorily, except for the penalty of having some rough roads in wet spring seasons, and Siler feels sure it is responsible for his state having a lot of miles of dust-free roads it could not otherwise afford. Of course, he'd like to see modern alignment, heavy subbases, full-section drainage, and all the other 1951 road-building improvements, but he is realistic enough to know they lie somewhere in the future so far as his state is concerned.

Other Maintenance

Other maintenance follows conventional methods. Many of the older portland-cement-concrete highways are now obsolete, and the construction department has many new contracts pro-

gramed for the realignment and reconstruction of some of these routes. Where portland-cement-concrete roads can be saved for a few more years, maintenance men are doing some Mud Jacking, spot patching, and other betterment work. Contracts have been let in many locations also for pavement widening, and resurfacing with hot-mix asphaltic concrete.

There is very little movement of men or equipment between the six division points at Topeka, Salina, Norton, Chanute, Hutchinson, and Garden City. Maintenance sections or patrols consist of average lengths of about 30 miles. In each section there is a section foreman, helpers, and whatever equipment is needed. In the past few years the State has purchased much new equipment, from snow-removal machines to mowers. Each division is now fairly well staffed and equipped to do its maintenance work promptly. However, national defense activities, with their much more attractive compensation, and calls to military services are cutting into the Department's manpower. The situation is becoming quite serious in some localities, and it is expected to become more acute as defense activities increase in the state.

If some of the roads are slightly rough, especially in the spring, Siler can look with some measure of tolerance on that situation. For he remembers all too well what spring thaws and rains can do to an unimproved road!

In addition to the 3,564.3 miles of low-type bituminous highway under Siler's care, the following other mileages make up the balance of Kansas highway system:

Unimproved earth	2,901
Graded and drained	731
Gravel and stone	1,241.7
Bituminous surface-treated, prepared base	472.3
Bituminous mixed on prepared base	657.9
Bituminous mixed without base	1,501.4
Bituminous penetration macadam	753
Asphaltic concrete	315.9
Portland-cement concrete, 2-lane	1,180.3
Brick	28.3
Four-lane, all types	38.7
Military reservation, all types	12.4
City connecting links	208.7

Maintenance by Siler's department is administered under the general supervision of Roy W. Cox, Director, and R. C. Keeling, State Highway Engineer in Topeka.

Preventive maintenance is more essential than ever. The careful selection and use of good lubricants at regular intervals will keep your equipment operating efficiently.

PREVENT COSTLY

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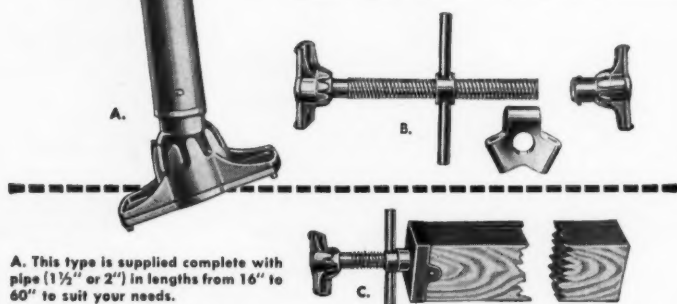
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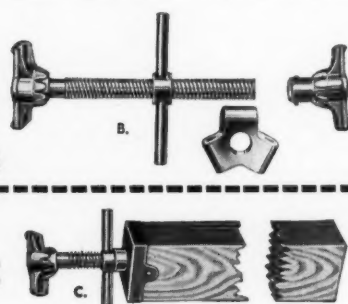
Unexcelled for safe and economical bracing of all trench and excavation jobs... Duff-Norton Trench Braces are of strong construction... easy to install, easy to maintain when not in use. Write today for full information and proposal on your requirements.



A. This type is supplied complete with pipe (1 1/2" or 2") in lengths from 16" to 60" to suit your needs.

B. Steel fittings only are supplied without pipe if desired. Used with 1 1/2" and 2" pipe.

C. Steel timber brace fittings are furnished without timbers for use with 4" x 4"—6" x 6" and 8" x 8" timbers.



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(Tested successfully against jet fuels and fire)

You can make better blacktop installations with MECO Surface-Seal. Contractors know that MECO seals, renews and tightens the surface, as well as beautifying the pavement. It is particularly useful on areas which take a lot of punishment. Gas stations, parking lots, airports and private

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Economical and easy to use, MECO Surface-Seal will give you a better job on your next blacktop contract. Makes old driveways new—makes new jobs last longer. Write for folder and names of satisfied users. Distributors in all major cities.

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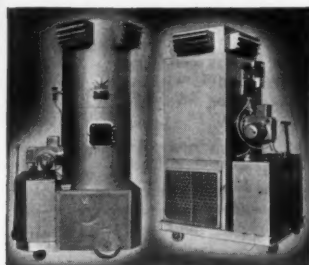
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The Thermobloc portable heater at left provides 300,000 Btu; the one at the right comes in 100,000 and 200,000-Btu models.

New Portable Heater For Field or Office

The Thermobloc Division of Pratt-Daniel Corp., South Norwalk, Conn., has developed a new portable heating unit to provide controlled temperatures under field or shop conditions. Thermoblocs are complete with fuel tanks and are mounted on easily moved trucks. They are available with heat outputs ranging from 100,000 to 300,000 Btu per hour.

The unit takes in cool air at the floor level and discharges warm air horizontally overhead. As the cool air is induced at the floor, currents from the horizontal warm-air stream are drawn down. Thus, the company says, heat is retained in the personnel zone instead of being lost at high levels.

Thermoblocs are built to accommodate either a gas or fuel-oil burner interchangeably. Fitted with recirculators, they may be used to produce temperatures of 400 to 500 degrees F for drying towers or other process applications.

Literature describing the units in detail and giving complete specifications and methods for determining heat load may be obtained from the company, or by using the Request Card at page 16. Circle No. 144.

New Crushing Plant

A new portable gravel plant featuring the Anderson dual-jaw crusher has been introduced by Highway Machinery Co., 420 Frederick St., Waukesha, Wis. Designed for an output of approximately 125 yards per hour of minus-3/4-inch material, the machine can be moved from job to job without dismantling or telescoping any parts.

There are two opposed crushing compartments, both actuated by a single movable pitman carrying two opposed jaw dies. The crusher is fed by a 2 1/2-deck positive-throw eccentric-type vibrating screen, with plus-3-inch material going to the primary jaws and minus-3-inch to the secondary jaws. As both movable jaws are actuated by the one eccentric, crushing is continuous and output is high, the company says. Because of the location of the eccentric with relation to the movable jaws, a nearly circular motion is imparted at the discharge end, resulting in rapid material flow without compaction and with minimum wear on the jaws, the company says.

The jaw crusher has a primary opening 11 x 36 inches with a secondary opening 5 x 36 inches. A roll crusher is available with a 16-inch diameter x 20-inch face or 24-inch diameter x 20-inch face. Conveyors have roller bearings throughout and tail pulleys are self-cleaning. The receiving hopper has a capacity of 2 1/2 yards and may be



This portable gravel plant made by Highway Machinery Co. features the Anderson dual-jaw crusher. The basic plant may be pulled by a 3-ton truck.

shovel-fed at 10 feet 6 inches. The self-cleaning grizzly bars are sloped to discharge pit boulders automatically. The entire unit is powered by a 110 to 120-hp diesel engine and is mounted on a Hendrickson self-equalizing tandem rear axle with air brakes and

eight 9.00 x 20 tires. The basic plant, including power, weighs 44,000 pounds and may be pulled by a 3-ton truck serving as tractor and front axle.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 200.

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TAKE IT ANY WAY YOU LIKE
by location . . . by type of job . . . by the
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Don't take our word for it—that Richmond products are America's most widely used and highly rated form-tying devices. Look at the record, in any city you choose, from the Atlantic to the Pacific. You'll find Richmond products have been used on a greater number of jobs—selected for more big important projects—specified more frequently by leading contractors, than any other products in their field.

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THE NAVY AND SEE THE
WORLD—I'VE BEEN ALL
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YUP—AND WHEREVER WE GO
THE SMART BOYS
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Get your "Screw" or "TY"
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Savings
IN money"

By the use of
**ATLAS
SPEED
FORMS**

"We have been able
to effect substantial sav-
ings in the time . . . to set
up . . . and . . . tear down,
which means untold sav-
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RICHMOND KNOW-HOW—DEPENDABILITY—SERVICE—ESTIMATES & JOB PLANNING

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Government Official's Decision Was Binding

THE PROBLEM: A Government construction contract, standard form, required the contractor to protest promptly any demand that he do work considered by him to be outside the contract. It made final the Secretary of War's decision on an appeal taken from an adverse finding by the contracting officer. Another clause provided that except as otherwise specified, the contracting officer should decide "all disputes concerning questions of fact".

The contractor claimed that certain grading done by him was outside his contract and that he was entitled to extra pay for it. This claim was disallowed by both the contracting officer and the Secretary's representative. Was the contractor entitled to sue in the Court of Claims for extra pay?

THE ANSWER: No. (United States v. Moorman, 70 Sup. Ct. Rep. 288, decided Jan. 9, 1950, by the United States Supreme Court, reversing a contrary decision by the Court of Claims, 82 Fed. Supp. 1010, 113 Ct. Cl. 159.)

First, the Supreme Court noted that at least twice before the Government had complained of a tendency of the Court of Claims "to whittle away the authority of designated officers of the United States to make final decisions under contracts."

Then, the court observed that it had long recognized the validity of contract clauses giving conclusive effect to decisions of Government officials as to whether particular work fell within the requirements of a particular contract.

The court conceded that a contractor should not be deemed to waive a right to resort to the courts to settle disputes of this kind unless "plain language" of the contract compels a decision that waiver was intended. "If parties competent to decide for themselves are to be deprived of the privilege of making such . . . provisions for settlement of disputes," it is up to Congress to so declare by statute.

The opinion points out that the courts of "almost every state" have upheld

the validity of contract clauses of this kind in cases governed by state law. But in Indiana the courts have reached a contrary conclusion, the Supreme Court notes, "on the ground that permitting engineers or other persons to make final determinations of contractual disputes would wrongfully deprive the parties of a right to have their controversies decided in courts."

The Supreme Court said that the clause of the contract which provided for decisions on disputed facts by contracting officers did not limit their power to make a final and binding decision, under the first-mentioned clause, as to proper interpretation of a contract as including or excluding certain work claimed by the contractor to be an extra.

Bid Error Held Fundamental: Withdrawal of Bid Justified

THE PROBLEM: Many, if not most, courts agree that when a bidder bids too low on a contract through mistake, he is entitled to withdraw the bid—provided that he has not been negligent in computing it, that he promptly withdraws it before any prejudice results to the contracting authority or third parties, and that the mistake was fundamental. Where a bid would have been \$200,753 had detailed figures been properly added, but a mistake in adding led to a bid of \$177,153, was there a fundamental mistake?

THE ANSWER: Yes. (School District of Scottsbluff v. Olson Construction Co., 45 N. W. 2d 164, decided by the Nebraska Supreme Court.)

In tabulating estimate sheets, an adding-machine operator listed a structural-steel item at \$2,689, instead of \$26,289. This mistake was reflected in a \$68,410 item of the bid, for work that had been estimated by the school district's architect at \$89,340 and upon which the only other bidder bid \$89,905. The other bidder's total was \$203,758—\$3,003 more than would have been bid by defendant contractor except for the mistake.

The District's suit for damages was

dismissed by the trial court, and the Supreme Court okayed the dismissal. The higher court's decision was based on these grounds: The mistake was a clerical one, and not an error of judgment.

The difference between the two bids filed was enough to indicate to the District the probability that a mistake had been made, but, assuming the con-

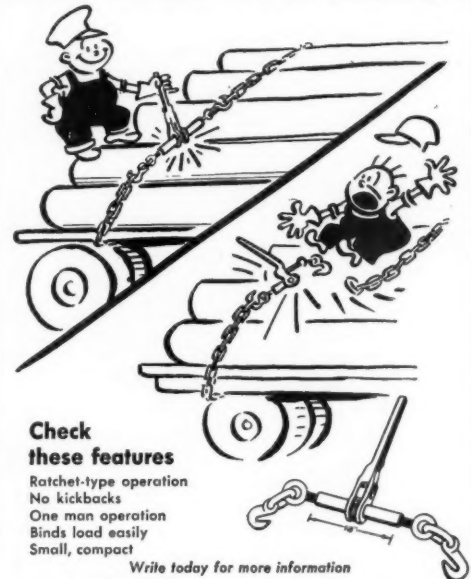
trary, defendant was still entitled to withdraw its bid under all the circumstances.

The mistake was discovered and reported to the District within four days after bids were opened, although after the bid had been accepted.

The District could not be regarded as loser to the extent of the difference

(Continued on next page)

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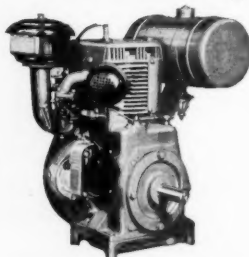
You can contribute to this might by seeing to it that all idle scrap in your possession gets back to the mills—where it can produce tools, machines . . . as well as tanks, guns and shells to protect our future security.

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4. Maximum torque at usable speeds for equipment that really has to go to work.

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Avoid Legal Pitfalls

(Continued from preceding page)

between the mistaken bid filed and the price that would have been bid except for the mistake. As decided by the Michigan Supreme Court (*Kutsche v. Ford*, 192 N. W. 714) one is not entitled to profit by the palpable mistake of another.

The Nebraska court cites decisions of the United States Supreme Court and of the appellate courts of Minnesota, New Jersey, Vermont, Rhode Island, Kentucky, Indiana, and Connecticut in support of its conclusions.

Land-Clearance Map Faulty—Contractor Gets More Pay

THE PROBLEM: A map on the basis of which contractors agreed to clear land for a park-improvement project indicated a total acreage of 298.69, involving 118.33 acres of light clearing, 161.01 of heavy clearing, and 19.35 of brush clearing. Computing a bid based upon \$220 for heavy clearing, \$180 for light, and \$130 for brush, the contractor arrived at an average of about \$200 per acre, and bid a lump sum, \$59,237.10.

As the work proceeded it became increasingly clear that the actual acreage greatly exceeded that shown by the map. The engineer insisted upon completion, which involved clearing 545.46 acres—an overrun of 246.77 acres.

(1) Was the contractor entitled to have the contract reformed and to collect for clearing the overrun? (2) In the absence of proof as to the character of clearing involved in the overrun, did a court properly limit the contractor to pay on a basis of brush clearing?

THE ANSWER: Yes. (*Schwaderer v. Huron-Clinton Metropolitan Authority*, 45 N. W. 2d 279, decided by the Michigan Supreme Court.)

1. The decision on the first point rested upon these principal facts: The contractor had no time before bidding within which to verify the acreage to be cleared. Adoption by the bidding specifications of the acreage shown on the map was an assurance as to accuracy. The contracting authority knew that the bid relied on the map's accuracy. The contractor was not informed as to how the map had been prepared or given other inkling that might have suggested possible inaccuracy of the estimated acreage.

The court decided that the contractor's right to have the contract equitably reformed could rest upon a theory of constructive fraud on the part of the contracting authority, or upon a theory of mutual mistake.

2. But the burden was upon the contractor, in his suit, to show how the extra clearing was apportioned, as to light, heavy, or brush. The court could not guess that the overrun was apportioned the same as the acreage shown on the map. So the court properly allowed pay on the assumption that all was brush clearing, and not on the basis of a \$200 average.

Motorist Drives Off Bridge; Warnings Had Been Removed

THE PROBLEM: Under a Georgia law, a county is not liable for injury to travelers which results from failure to post warnings against the defective condition of a bridge. A motorist drove at night upon an approach to a bridge that was out. Warnings erected there had been removed. The road contractor knew this. Did the Georgia law protect the contractor?

THE ANSWER: No. (*State Construction Co. v. Johnson*, 62 S. E. 2d 413, decided by the Georgia Court of Ap-

peals.)

The court followed decisions in earlier cases, to the effect that Georgia is one of those numerous states in which the fact that the State or one of its political subdivisions is exempt from liability for negligence in the operation of highways does not relieve from liability a contractor who undertakes to construct or repair a road for the State or a subdivision.

Ditch Completion was Timely

THE PROBLEM: A contractor agreed to start cleaning and extending a ditch about January 20 in northern lowlands, if weather conditions were not too extreme. Work was started April 19 and completed May 19. Frost conditions delayed the work, but it could have been commenced earlier than April 19. Was the work unreasonably delayed?

THE ANSWER: No. (*Cook v. Johnson*, 221 Pac. 2d 525, decided by the Washington Supreme Court.)

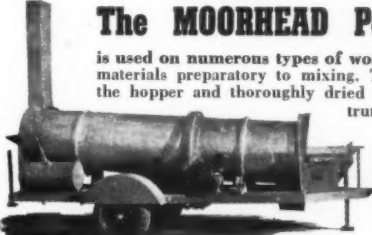
Workmen's Compensation

THE PROBLEM: A general contractor sublet brick construction to A and haulage of materials to B. B's truck driver got pinned between the bed and cab of the truck. A's employee was injured while helping to release him. The general contractor carried compensation insurance on his own employees, but required subcontractors to insure their

employees. (1) Was the general contractor liable under the Oklahoma compensation law for the injury to A's employee? (2) Was A liable?

THE ANSWER: The general contractor was not liable, but Subcontractor A was. (*Denton v. Young*, 226 Pac. 2d 406, decided by the Oklahoma Supreme Court.)

The arrangement between the gen-
(Concluded on next page)



The MOORHEAD Portable Aggregate Drier

is used on numerous types of work where it is the purpose to heat and dry materials preparatory to mixing. The material is thrown or discharged into the hopper and thoroughly dried and heated in traversing the length of the tumbler by the intensely hot flame of the burner.

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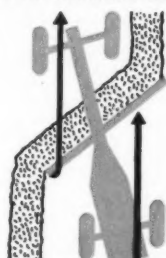
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True — you cannot actually see All-Wheel Drive in action on the average job; but it is "in there pitching" every minute . . . providing increased traction . . . moving more material . . . holding the front end steady.

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Yes — All-Wheel Drive and Steer Go Together on every job . . . Work Together as a team, for maximum performance, in minimum time, at lowest cost.

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Austin Western

SINCE 1859



Avoid Legal Pitfalls

(Continued from preceding page)

eral contractor and his subcontractors prevented him from being even secondarily liable for injury to employees of the latter. But the court said that A was liable since he could have foreseen that his employee would act as he did because of the relationship of the two men working on the same construction job. The injury to A's employee, then, was properly regarded as having arisen in the course of his employment by A.

Was Electric Company Liable For Death of Powder Man?

THE PROBLEM: A powder man on a highway blasting crew set off a charge of dynamite and the fuse wire contacted the uninsulated high-voltage wires of the defendant electric company's line along the road. The current arced through the fuse wire and electrocuted the powder man. Six weeks before this, when the contract for widening the road was let, the contractor had notified the electric company that the work would begin immediately. Was the electric company liable for the man's death?

THE ANSWER: No. (Pascoe v. Southern California Edison Co., 227 Pac. 2d 555, decided by the California District Court of Appeal, Second District, Division 1.)

The court said that the electric company was not bound to insulate its wires if they were high enough not to endanger "normal use of the highway for travel or other proper purposes". The notice that work would begin immediately did not charge the electric company with knowledge that blasting operations would be carried on at a particular spot and on a particular day. Nor did the contractor, although working on a state project, have a right to require the electric company to cut the current while his employees were working under the wires. He had used blasting in widening the highway "at his own peril with a liability for damages for any property injured, such as the property of the defendant." The court said that both the road contractor and the deceased workman were aware of the arcing propensities of electricity

and were bound to foresee what would happen if the fuse contacted the electric line.

The court distinguished this case from an earlier case where an electric company negligently permitted a high-voltage wire to come in contact with a low-hanging telephone line wire, and was held liable for the death of a power-shovel operator. The death occurred when the shovel came in contact with the charged telephone wire. (Jackson v. Utica Light & Power Co., 149 Pac. 2d 748.)

Public Contract Awards Permissible Conference

THE PROBLEM: A city received proposals to design and construct an incinerator and garbage-reduction plant of alternative type and conforming to basic plans and specifications. It was left to each bidder to ground his proposal upon detailed plans and specifications to be submitted as part of the bid. After the bids were opened, the lowest bidder, to whom the contract was awarded, conferred with the city authorities. Did this conference invalidate the contract?

THE ANSWER: No. (Corcoran v. City of Philadelphia, 70 Atl. 2d 621, decided by the Pennsylvania Supreme Court.)

The bid raised questions concerning whether it complied with the City's specifications, without implying that they were insufficient. Some variance in detail was apt to result, and that was taken into account by providing for consideration of the same by the City's consulting engineers. A conference of the engineers, city officers, and representatives of the bidder disclosed that the bid conformed to the city's plans and spec and that no changes were needed. Such procedure was open to all bidders who had equal opportunities to suggest changes in the plans and spec. So the City's determination that the bid under consideration was the lowest responsible one was not open to objection that the award was made under private negotiations in disregard of the legal requirements for competitive bidding.

Shifting Employment and Workmen's Compensation

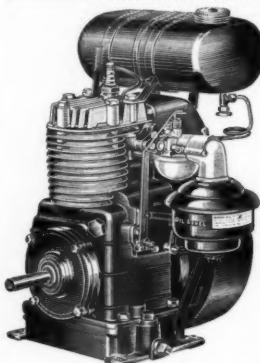
THE PROBLEM: An Ohio construction company, following its usual procedure, terminated its Ohio contract with an

employee who worked for it in different states as his services were needed, and sent him to West Virginia. There a foreman rehired him for work in that state, and there he was killed on the job. Was his widow entitled to invoke the Ohio workmen's compensation law, which afforded more liberal compensation than the West Virginia law?

THE ANSWER: No. (Green v. Indus-

trial Commission, 91 N. E. 2d 815, decided by the Ohio Court of Appeals, Hamilton County.)

The court decided that the mere fact that the company allowed the workman for time and expense in traveling from Cincinnati, where the contractor's home office was, to West Virginia did not subject the employment contract to Ohio law.



MODEL K-12-2, 3 H. P., 4-cycle, single cylinder, air-cooled. Length 14", width 14", height 19". Weight 43 lbs.

RELIABLE POWER FOR:
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STANDARD STEEL "S-J" for PATCHING SPEED



PERFORMS EVERY MAINTENANCE FUNCTION... SPRAY SHOULDERS • RELOCATE CURVES • PATCH CHUCK HOLES • SEAL COAT and SECONDARY CONSTRUCTION WORK

Powered by either 7.2 h.p. or 15 h.p. engine, equipped with a 100 GPM Pump, this Model "S-J" will handle any type of material with equal efficiency—uniformly applying material from end to end of spray bar up to 10-foot length. Two powerful burners supply intense heat through 5-inch heat flues—and fast heating is assured. Dual lever controls all operations. A curb side gravity draw-off permits easy crack-filling and sealing.

Mayor Ray E. Otten, Versailles, Mo., says: "We're doing some fine work with this machine..." It's a money-saver on any type job that can be handled with this fast working equipment.

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Cyclo-twist AND **Thunderbolt**
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Strong. Accurate. Positively
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36" deep at lowest cost per
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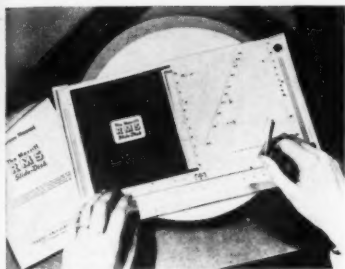
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One mechanical operation of the Merrill RMS Slide-Disc calculator completes as many as five separate mathematical steps in about two seconds. Statisticians in engineering research will be interested in this device. Graphic Calculator Co. makes it.

New Desk Calculator For Statistical Work

A new desk calculator for statisticians in engineering research is said to give results faster than an automatic computer or slide rule, after only a few minutes of instruction in its use. It was developed by Graphic Calculator Co., 633 Plymouth Court, Chicago 5, Ill.

The Merrill RMS Slide-Disc can make complicated statistical analyses to an accuracy of 0.5 per cent or better. One mechanical operation of the calculator completes as many as five separate mathematical steps in about two seconds, the company says. Squares, sums of squares, and square roots, which are commonly required in statistical work, are all performed simultaneously on the calculator. It can be used to solve standard deviations, root-mean-squares, correlation coefficients, geometric and harmonic means, etc.

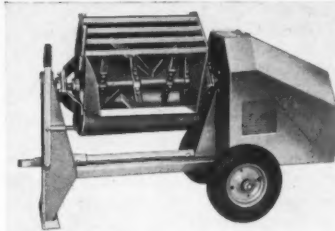
Based on principles of geometry, the calculator consists of a 10-inch disc which slides and rotates freely beneath a pair of vertical and horizontal scales on which a series of right triangles is graphically formed. Both linear and logarithmic scales are furnished with it. The calculator is approximately 12 x 8 inches x 1 inch. Its critical parts are made of Vinylite plastic rigid sheet, which has exceptional dimensional stability, is resistant to flame, moisture, and most chemicals, and is easily cleaned with a damp cloth. The complete set also contains a 14-page instruction manual and a needle-steel stylus with an aluminum handle.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 166.

Plaster-Mortar Mixer

A new portable 1/2-bag plaster and mortar mixer known as the Mix-Miser is manufactured by The Knickerbocker Co., 654 Liberty St., Jackson, Mich. It has a 3-cubic-foot capacity and is designed for small jobs requiring a limited mix and for larger construction where it is desirable to keep the mixer close to the work. It has an over-all width of 29 1/2 inches and weighs 535 pounds without the engine.

The No. 3 mixer has a charging height of 36 3/4 inches, and a hinged protecting grid to permit safe charging without stopping the machine. The drum can be tipped past the discharge position for cleaning. Corrosion of bearings is said to be eliminated by "labyrinth" packing glands which protect drum bearing from lime and cement seepage. The mixing shaft and drum are suspended on four self-aligning ball bearings. Replaceable blade and hoe assemblies are bolted to the shaft. The new mixer can be pow-



The Mix-Miser is a 3-cubic-foot-capacity plaster and mortar mixer which can be powered by a gasoline engine or electric motor.

ered by a Briggs & Stratton 2.3-hp air-cooled gasoline engine or 1-hp single-phase electric motor. Drive with either engine or motor is through positive gear trains with correct reductions, all housed under a steel weathertight hood. The mixer has pressed-steel wheels with 4.00 x 8 pneumatic tires.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 120.

Materials-Handling Units

A new comprehensive catalog on materials-handling equipment has been released by Yale & Towne Mfg. Co., Philadelphia Division, 11000 Roosevelt Blvd., Philadelphia 15, Pa. It includes a general description and application data on Yale's gas and electric fork-lift trucks, motorized hand trucks, hand lift trucks, and hand and electric hoists. In one portion of the catalog, 22 line drawings illustrate attachments available for Yale industrial trucks.

This literature may be obtained from the company, or by using Request Card at page 16. Circle No. 131.

Jiffy Products Moves

The Jiffy Products Co., manufacturer of reversible teeth for trenching machines, has moved its offices and plant from 3611 Parry St., to 8402 Harry Hines Blvd., Dallas, Texas. Clifford Hartley is President of the firm.

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The BROWN COMPANY, Quality Paper Makers of Berlin, New Hampshire, said this in an operating report on one of their Kraft Mill Lime Kilns after changing over from conventional oil lubrication to LUBRIPLATE No. 130AA. Huge savings like this cannot be overlooked. It is worth your while to see what LUBRIPLATE Lubrication can save you.

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Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

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COMMENT from the BUTLER ENGINEER

June, 1951

"No! No! Senor!" (Spanish For "No Soap!")

Even though I'm a conservative engineer, I can think of only one word to describe a Butler Ready Mixed Plant erected in Havana, Cuba: "Terrific!"

That plant had everything - including - so help me, a mahogany floor for the batching platform. It was erected right in the middle of downtown Havana. Concrete yard and approaches. "Magnifico, senores!" Came the great day of the formal opening. Flags flying. Airplanes roaring overhead. Crowds cheering. Everything ready for the push-button ceremony to start the plant. Suddenly came word from the city authorities. "No. Nix. Positively not. No Ready Mixed Plant in downtown Havana!" So you think you got troubles?

Well, here's the happy ending. The city bought the land, paid for dismantling and re-erecting the plant. And paid for the new site, too!

Writing of the tropics reminds me of the Arctic. Butler's there, too. A complete Butler Road-builders Plant shipped north by rail until the tracks ended in a snow drift. After that it was "weasled" across the snow and ice way up beyond the Arctic Circle. Just in case you don't know - and I didn't - a "weasle" is a snow going jeep. Operates on a crawler track. Speaks well for portability in Butler design, doesn't it?

And the only Ready Mixed Plant in England is a Butler, too. It's a great attraction. In spite of austerity and gasoline shortages, Britons come from all over the country to watch it. They're used to 3 and 6 bag mixers - some as much as 50 years old.

See you in August,

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

HEAVY-DUTY TRENCHER

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent and is easily attached by one man in 15 minutes.

The Whitestown trencher is equipped with a 1/2-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will

dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for

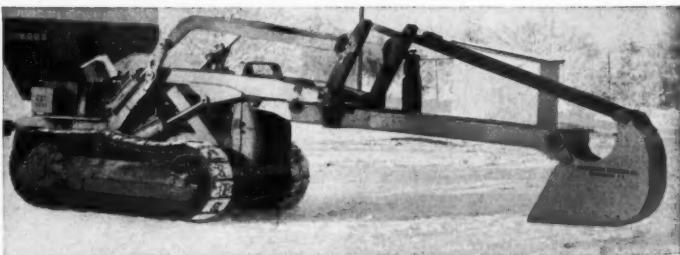
three years, and has proved to be rugged and satisfactory in every way.

Immediate delivery can be made.

WHITESTOWN TRENCHER CO., INC.

Wood Road, Whitesboro, New York

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The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:

Allis-Chalmers HD-5G equipped with TS-5 Tractor-Shovel
Caterpillar D-4 and Trackson HT-4
International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel.
International TD-6, TD-9 & TD-14-A with Hough Bulldozer-shovel
Hough Model HM-Payload
Oliver with 4-A Lull Loader

Toll Roads Are Back: Let's Learn From Them

The toll road is no cure-all for our highway ailments. But it does serve a purpose. It is at least a modern road built quickly where it is needed. And it is a warning that traditional methods of road financing have failed, that they must be revised.

That is the thesis of a new study published by The Brookings Institution—"Toll Roads and the Problem of Highway Modernization" by Wilfred Owen and Charles L. Dearing.

The first half of the book fills in the background of the problem. It points to the resurgence of the toll road in the 20th century—in Pennsylvania, Maine, New Hampshire, Connecticut, New York, New Jersey, Oklahoma, Colorado, Ohio, and elsewhere. More than half our states have now built, or are building, or are considering toll roads. Why? Because traditional ways of financing roads have been inadequate. Because at a time when high costs have shrunk the highway dollar, states have been hampered by restrictions on bond issues, opposition to tax increases, and laws that prevent them from concentrating the funds they do have on roads where traffic is densest. Revenue bonds secured by tolls have been a way out, and states have been quick to jump on the bandwagon set rolling by Pennsylvania.

This way out has its own disadvantages, of course. In the first place, it is only a partial way out. It cannot apply to cities where traffic congestion is greatest. On rural roads it is limited to a relatively small mileage of principal arteries where traffic volume is large. Second, it creates the annoyance and expense of the toll gate, and the problem of maintaining parallel free roads. But the toll road is here, apparently to stay. And the real problem now, Owen and Dearing point out, is how to revise the outmoded highway policies which made the toll road necessary in the first place—policies which will keep on blocking modernization of the huge mileage the toll road can never hope to supplant.

The second half of the book suggests policy revisions. It discusses alternatives to the public policy of state highway departments—alternatives to poor management, the inflexible gas tax, the politics in road programing, the limitations on long-term borrowing for highway purposes.

It also suggests alternatives to the policy of the Federal government. One long-term alternative has frequently been proposed: Let the Government reduce Federal gas taxes and stop direct road appropriations to the states, in order to induce them to raise the necessary revenue through their own fuel taxes; let Government stick to policy forming, research, and regulation. But that is only a remote possibility today, the authors point out. For the present, the Government might better promote the interstate system by allowing states to use toll financing when they want to, by extending Federal Aid to toll highways just as it now does to toll bridges. "In this way the states would be afforded greater opportunity to integrate the use of toll financing with their traditional methods of administration and finance."

The toll road and the free road are not conflicting approaches to the problem, say Owen and Dearing. They are merely different ways of reaching the same goal: adequate highways. The toll road can be integrated into the conventional system of managing and financing highways. Duplication can be avoided "by planning the toll road in conjunction with the state highway system as a whole, by maximizing the common use of engineering services and equipment, and by placing responsibility for the toll road in the highway department rather than in an auton-

mous authority."

To remove the conditions which have led to the return of the toll road, we will have to revamp our tax structure, liberalize our borrowing procedures, and revise our expenditure patterns. *Meanwhile*, for as long as these reforms are blocked, "the toll road can serve under limited circumstances as a supplement to traditional methods of highway development."

"Toll Roads" is available from The Brookings Institution, 722 Jackson Place, N. W., Washington 6, D. C. It costs \$2.50.

Drafting and Drawing Tools

A 4-page bulletin describes and illustrates the major items in the draft-

ing and drawing materials made by Berger Scientific Supplies, Inc., 342 Madison Ave., New York 17, N. Y. Berger makes a variety of drafting sets designed to suit individual requirements, slide rules, scales, T-squares, protractors, and transparent curves.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 211.

Maintenance and Care Of Clamshell Buckets

A new bulletin containing 42 pages of practical information on the care of clamshell buckets has been released by Blaw-Knox Division, Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

It includes suggestions on the proper

use of clamshell buckets, and lists common abuses to be avoided. Of particular interest to operators is the section on bucket lips—what makes them bow in or bend out. The booklet tells how to straighten distorted lips, how to repair fractures, how to hard-surface cutting edges, and how to rebuild worn cutting edges.

"How to reeve the bucket for maximum efficiency" is another subject described in detail and illustrated for easy understanding. There are also practical tips on prolonging bucket cable life and diagramed instructions for replacing component parts. Valuable data on lubrication are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 179.

"Big
Red"



A New Space Heater

No smoke pipe or fuel line is required for the new portable, automatic, radiant-type space heaters engineered by Quiet Automatic Oil Burner Corp., 33 Bloomfield Ave., Newark 4, N. J. The new hot air model produces heat by convection and by radiation at the same time, for outside or inside construction work.

The air is forced through the gun of the burner by a motor-driven axial blower. The gun is fitted with a Catomic Adjustable Turbulator, said to give perfect combustion with no smoke or sparks. As the air leaves the gun, it is split so part of it moves over the outside of the stainless-steel combustion chamber; the other part is used



This portable space heater for outside or inside construction work produces heat by convection and by radiation at the same time.

at the nozzle for combustion.

Burning No. 2 fuel oil, this heater is rated at 200,000 Btu. Completely auto-

matic operation is effected by a thermostat at the end of an extension wire. When the power extension line, 110 volts, is plugged in, the unit is ready to operate. Over-all dimensions are 4 x 2 x 3 feet. Rubber-tired wheels are at one end of the base, and there is a handle at the other end.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 189.

New Engineer for Arizona

K. C. Perkins succeeds W. C. Lefebvre as State Highway Engineer for the Arizona Highway Department. Mr. Lefebvre resigned to accept an appointment as Postmaster for the City of Phoenix. Mr. Perkins has been Deputy State Engineer.

How International's "Big Red" Champ outworks the field

When the TD-24 teams up with a loading machine, dirt gets moved from ground to trucks in record time. And the "men who move the earth" are finding this out.

Like the D. W. Winkelman Co., Inc. on a job near Syracuse with a TD-24 loading out 22 pay yards every minute.

"Our TD-24 is the best machine we've ever had," says Superintendent George Cecil. "Pulling the loader, it loads out eleven pay yards every 30 seconds. And it's the only machine we've found that can do a good lugging job with this big loader!"

That's another way of saying International's TD-24

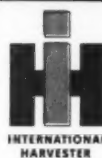
is the most powerful crawler built—the hands-down champ at any job where the pay-off is for more production, stamina and "handle-ability." You can turn with power on both tracks. You can shift "on-the-go." You get going fast, with push-button starting, in any weather.

Look at the record. Ask your friends in the business. Ask your International Industrial Distributor for the low-down on the TD-24. And, times being what they are, ask him about his expert field service and big-time shop facilities for the hard-working years ahead. You'll be a TD-24 man from then on in!

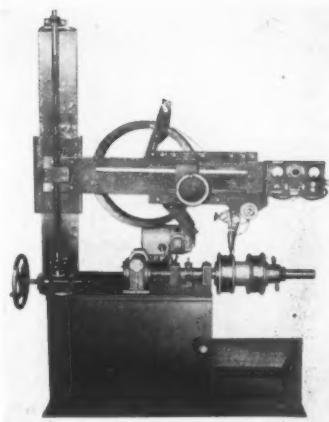
INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

A WINNER FOR WINKELMAN! This big red TD-24 really pays off, loading 22 pay yards a minute for D. W. Winkelman on a job near Syracuse, New York.

INTERNATIONAL



POWER THAT PAYS



This is Mir-O-Col's Model K-1 Automatic Rebuilder—a submerged-arc automatic welder with a work positioner, to rebuild worn equipment parts.

Rebuilds Worn Parts

A new line of automatic welding and positioning equipment for rebuilding worn equipment parts such as tractor idlers and rollers, shovel rollers and shafts, crusher cones, etc., has been announced by Mir-O-Col Alloy Co., 312 N. Avenue 21, Los Angeles 31, Calif.

The equipment employs the submerged-arc principle of automatic welding. An ac transformer-type welding machine is used in conjunction with a work positioner. It is capable of handling conical or cylindrical equipment parts weighing up to 750 pounds, and not less than 4 nor greater than 36 inches in diameter. All work is held on centers to assure a concentric buildup of the worn part, the company states.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 193.

New Portable Light

A new portable electric hand lamp, designed to throw a 2,000-foot light beam, has been announced by U-C Lite Mfg. Co., 1050 W. Hubbard St., Chicago 22, Ill. The Big Beam Model 700-A is powered by four standard No. 6 dry-cell batteries. These are enclosed in a two-piece hinged container of 20-gage deep-drawn steel, equipped with two snap catches. The battery container, the base of which is waterproof, is finished in acidproof red enamel. It has a 6-inch adjustable lamphead with a silvered parabolic reflector. Prefocused main and auxiliary bulbs for bright and dim light respectively are controlled by a 2-way toggle switch.

The lamp's simplified connecting plate with permanently attached cell-to-cell contacts assures correct battery replacement, the manufacturer says. Accessories include a hold-down bracket; leather shoulder strap; wire guard; and snap-on lenses in red, green, blue, or clear-frosted.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 182.



The Big Beam Model 700-A electric hand lamp throws a 2,000-foot beam of light. The lamphead is adjustable.

Safe Construction And How You Get It

Three Experienced Men Give Some Top-Drawer Advice on
Recognizing Hazards and Making Safety Pay Off

By MICHAEL A. SPRONCK
Associate Editor

• WHEN three experienced construction men have something to say on safety, it pays to listen. When their talks cover building underground, on the surface, and into the sky, there isn't any man who can't profit from their advice. They will tell you why the "Rube Goldberg" devices used in underground hauling are more dangerous than TNT, why there are more accidents on a job now than 25 years

ago, and why safety pays 10 to 1 on any job. At least that was part of what they told some 200 attending the Construction Section of the 21st Annual Safety Convention and Exposition of the Greater New York Safety Council, April 3 to 6, at the Hotel Statler in New York City.

The 24-Hour Night Shift

Alfred Hoftieser, Safety Engineer for Lavarack & Haines, Buffalo, N. Y., has had over 25 years of experience, doing everything from pick-and-shovel work, to running a dinky, to over-all job supervision. Underground work, he says, has all the hazards of other operations plus many which are peculiar to itself.

In the first place, half the work is done just the opposite from the way you do it above ground. Steel isn't lowered into place, it's pushed up into place. And concrete isn't poured, it has to be pumped up into the forms and the cavities have to be grouted. This reversal of normal procedures presents some difficulties, he said, but the most serious difficulty is the lack of natural light underground, where "we have a 24-hour night shift". Artificial light causes two problems: keeping light out of the eyes of the worker, and preventing the shadows that tend to confuse him. We still don't have all the lighting we need, he said, and that is only the beginning of the hazards.

The Hauling Hazard

Blasts and roof falls get all the publicity, but underground haulage causes more accidents, according to Mr. Hoftieser. Amputated or broken arms and legs, smashed fingers, and sometimes death keep occurring with monotonous regularity, gnawing away at all safety records.

Diesel-powered units have been used successfully, he said, but most tunnel haulage is motivated by electricity, either from an overhead trolley or from

storage batteries. With the first you have the hazard of electrocution; with the second you have the hazard of a cumbersome unit. Then there are all the pinch points and shear points on the mine cars and locomotives; the coupling devices alone make a punch press look like a Sunday-school picnic. We need to do more work on couplers to decrease hazards. Add to this the fact that men are always operating with shadow between the cars, and it is understandable why there are accidents.

Equipment isn't the sole cause, though. The dinky operator himself is one of the biggest hazards when he works too fast or is careless. Engineering, maintenance, and operating rules help minimize hazards, but they are no cure for the very real hazard presented by the man who operates the equipment. Mr. Hoftieser made the point that union rules hamper operator discipline.

A spectacular problem is the one-

track system, since it always needs a car changer—and many of these are Rube Goldberg devices. "The cherry picker and the grasshopper are two examples. Accidents involving this type of equipment are both frequent and severe", he said.

Other Underground Hazards

Another specific underground hazard is the hoisting equipment, since the same hoist is used for both equipment and men. Mr. Hoftieser stressed hoist and signal-device maintenance and said it should be a special project, separated from routine job maintenance. As for signals, the best ones, he said, will require a return or answering signal. Another problem with hoists is overload. "You don't have to worry about it when the men are going down, but watch that gang at quitting time", is his advice. Another hazard is securing the load on the cage. Gates on cages are particularly hard to maintain, but

(Continued on next page)

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on the job!"



Think of the man-hours you save by bringing water to the men, instead of making them stop work and go after it! They like it this way, too! Workmen have long recognized clean, safe Dixie Cups and Vortex Cups as an important health-protection measure!

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operating should not be permitted without them, he said.

Lack of proper maintenance can make the mucking machine dangerous, not only to the operator but also to the men working in the tunnel. Due to the limited space they cannot get away from the machine, and they become involved if the cables break, or the clutches slip, or the swing of the machine goes haywire.

There are two drilling hazards: one occupational disease, the other physical injury. Silicosis, he said, can be minimized by codes such as those in effect in New York State. He remarked that the mucking machine also causes dust and perhaps more attention ought to be given to it. Questioned about this later, he said that spraying water on a muck pile is not too effective since it penetrates only about 4 inches. Using a wetting agent with the water will enable it to penetrate as much as 24 inches, but it is expensive. If the price of the compound comes down, it may be a solution to the problem.

Speed causes physical injury, the second drilling hazard, and is a tough nut to crack. The men are always looking to beat past records. They use 3½ and 4-inch machines, and back strains occur all too frequently. Mr. Hoftieser pointed out that men working one above the other is a very real hazard, and recommended the use of an adjustable platform of 2 x 4's on edge. This moves right up to the face and prevents rock and broken drill steel from falling through.

Blasting Underground

On the whole, explosives handling is rather good in tunnels, he said, and the codes help a lot. The one keeping the blasting switch 2,000 feet from the face is really needed, for in a tunnel there is no place to go. He cited the case of a man killed by flying rock 1,600 feet from the blast.

"There is a lot of electrical equipment in tunnels. The blasting wires will pick up static and induced current. Watch this", he warned. "Keep all bus wires and shooting wires shorted. Care must also be taken to see that your explosive is not producing dangerous quantities of gas. Lack of smoke is no sure indication. When you find a powder that is doing a good job, stay with it."

"Be careful of over-blasting", he cautioned. Blasts that are too heavy can open a water, sewer, or gas line and flood the tunnel. The problem here is often the use of high-strength powders when the lower strengths would do as well, or in some cases even better. He mentioned having one over-enthusiastic blaster on the job for only three days. This chap's claim to fame was bouncing a trolley car off the tracks—from 85 feet below the street surface. You have to educate the blaster if you want to reduce property damage, said Mr. Hoftieser.

His over-all suggestions for safety on the job were three: Have all super-

visory personnel realize the worth of safety codes and see that they are followed. Get the men to wear all safety clothes—not just their personalized trademark, the safety helmet. Third, use all the safety help you can get on the job: from insurance companies, the Bureau of Mines, and the state agencies.

Mechanization Increases Exposure

From subsurface to surface construction was no jump at all for Ferdinand Hoefner, Safety Engineer for Hendrickson Bros., Inc., Valley Stream, N. Y., since his experience covers all types of work. He holds that there are probably more accidents, relatively, in surface construction alone than below the ground and up in the air. Working under the latter conditions a man is conscious of his hazards and exercises precaution. But with two feet on the ground, he exposes himself needlessly to danger.

Accidents are more numerous today than 25 years ago, he said, because it is

the volume of work produced that governs the injury rate, rather than the number of persons engaged. Increase in volume increases exposure to danger. And mechanization without safety precautions tends to increase the number of injuries and their severity.

Moreover, every accident does not produce a personal injury—there is the common occurrence of the "near miss", to which we must give equal consid-

eration when we go into the subject of accident prevention.

Modern Safety Program

It is the duty of every employer to study the subject of accident prevention, said Mr. Hoefner. "Let us consider how today one would attack the problem at the outset, in a company that does not employ a specialist. All

(Concluded on next page)

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**CONTRACTORS AND
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Safe Construction And How You Get It

(Continued from preceding page)

who need to be should be schooled in recognizing hazards and in protecting persons and property by applying and enforcing safety regulations. This can best be brought about by their all meeting together at designated times and places to receive instruction from competent persons."

Citing the experiences gained in his company, Mr. Hoefner suggested as the first step in the right direction a demand that every accident of any nature whatsoever be reported, by the involved employee personally, to an official of the company. The affair should be publicized, not to cause embarrassment, but to serve as an object lesson and forestall recurrences. The next big step is gathering together the various groups on the job at regular intervals.

Mr. Hoefner suggests that the programs be varied and above all interesting enough to be enjoyable—but not so enjoyable as not to be instructive. Hendrickson Bros. has provided a modern meeting room with chairs and tables, movie equipment, and even an adjoining kitchen and full catering facilities. Attendance is not demanded, but the meetings are held out-of-hours with invitations sent to selected groups. The programs usually consist of a business session, movies that carry a message, entertainment, refreshments, and a social hour. "A man who misses one meeting usually never misses another, and the man who attends one, attends all the future meetings. The purpose is never lost", said Mr. Hoefner.

The men are brought in trade by trade instead of job by job. This makes programing easier and gets better interest. The hazards peculiar to each trade can be discussed in detail. Take, for example, our chauffeurs, said Mr. Hoefner. "A few years ago our rate was sky-high. When we held these meetings they became so popular that the men themselves requested that they be held more frequently. In addition, we set up a review board where each accident is either cleared, suspended, or discharged according to the findings of the board. It took only a short time to reduce the accident rate from 9 per month to 9 per year. Our auto insurance rate was reduced 17 points this year."

Be Insurance-Conscious

"Yes", said Mr. Hoefner, "the construction man must be insurance-conscious." The contractor must carry almost every kind of insurance. Mr. Hoefner pointed out that his company's supervisors are kept advised at their group meetings of all facts and figures on accidents and insurance costs. As proof of the results of a well planned safety program, he cited his company's insurance-rating experience. "Our merit adjustment on compensation insurance has risen in direct proportion to the effort we put in on safety engineering, increasing year after year until we now enjoy a 39.7 per cent credit. The same is true of our liability-insurance rate which carries a credit of 50 per cent—that is, 39 per cent on normal and 11 per cent on excess limits", he said.

Safety Above the Ground

The third speaker on the platform, Vincent A. D'Amico, Superintendent of Construction for Gerace & Castagna, New York City, supported Mr. Hoefner on the economies of safety. "On a \$1,000,000 masonry payroll, the standard or board insurance rate is approximately \$50,000; however, with a previous high lost-time ratio due to accidents, the rate can be 10, 20, or even 30 per cent higher. Another contractor

with the same payroll on a similar job, but with few previous accidents, may pay only 50 per cent of the standard rate." This gives him a better margin on bidding.

Talking about over-all safety programs on building work, Mr. D'Amico said the first step is compliance with state and city codes. "Next lay down your own operational rules", he advised. "The methods we use are not startling, but are persistent. We erect proper barricades or provide plank decking at all floor openings. We clear up debris and all inflammable materials. We use patent-type suspended scaffolding. We provide overhead protection at all entrances in addition to that used on the bricklayers' scaffolds and at the hoists."

Some Rules to Follow

He cited some general rules followed

by his firm on its building work. "Use only an experienced man on the hoist, or a trainee with an old hand supervising the operation. Allow only two men to operate the hoist signals, one at the surface and one on the working floor, under the penalty of dismissal. Employ only skilled carpenters and scaffolders. Have daily inspections of outriggers and all connections of the bricklayers' scaffolds. All hoist cables should be inspected periodically and replaced when showing any signs of wear. Provide guards and enclosures for all machinery. Brief all men on your safety program."

These rules, he said, might be called the neutralization phase of safety work. They ward off accidents. In addition, there should be regular safety meetings. His company has found it convenient to hold them during the lunch hour. Insurance personnel direct

the sessions, using movies as often as possible. Attendance is voluntary. The over-all program has two divisions: first, eliminate hazards, use experienced personnel, and supervise the work with safety in mind; second, educate the workers and train them in cooperative safety. Because of the high turnover of personnel in the construction industry, training should be extended to each and every job.

The results of a successful safety program are many, he said. "It reduces the number of crippling or fatal accidents. It improves production. Those who work under safe conditions produce more. It also reduces work stoppages. It offers gains to the community; lower building costs and the well-being of the employee and his family. These are real and tangible results that are the incentive to intensive and continued efforts toward a safe job."

When the going's rugged...

that Pioneer Edges



Contractor Praises Pioneer Equipment

It wasn't by accident that Winston Bros. chose a Pioneer plant to handle this rough, tough "Ridge Route" job. The firm is well acquainted with the advantages of Pioneer equipment. Just recently they told us, "We have three of your quarry and washing plants on our projects in Colombia, South America. Project managers report very satisfactory results with little delay caused by breakdown. This is very important because the equipment is so far from the source of supply."

BUY BOTH!

HIGHER OUTPUT
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Two-Way Radio Aids A Construction Firm

Last summer Bob and Lee Blades, owner-operators of A. L. Blades & Sons Construction Co., Hornell, N. Y., invested in a General Electric two-way mobile radio system. They now have mobile units in their cars, and the cars of superintendents of the firm's three divisions—contract, blacktopping and road oiling, and asphalt distributing—are radio-equipped. The two remote-control stations, one at the Hornell office and one at the Hornell bituminous plant, also serve as repeater stations when the mobile units cannot contact each other because of distance. The station transmitter and antenna are on a hill near Hornell, 1,850 feet above sea level. This height enables the headquarters stations to saturate the area within a 30-mile radius, and this



On a routine visit to a road-building crew, Bob Blades of A. L. Blades & Sons Construction Co. found this earth-mover overturned. Using the G-E two-way radio in his car, he had help sent pronto. At right, a dispatcher at the Blades bituminous plant uses a G-E remote-control station to coordinate wide-spread jobs.

range can be extended to 60 or 70 miles if the mobile unit is on another high point.

The firm operates in six counties in southeastern New York and northwestern Pennsylvania. In addition to

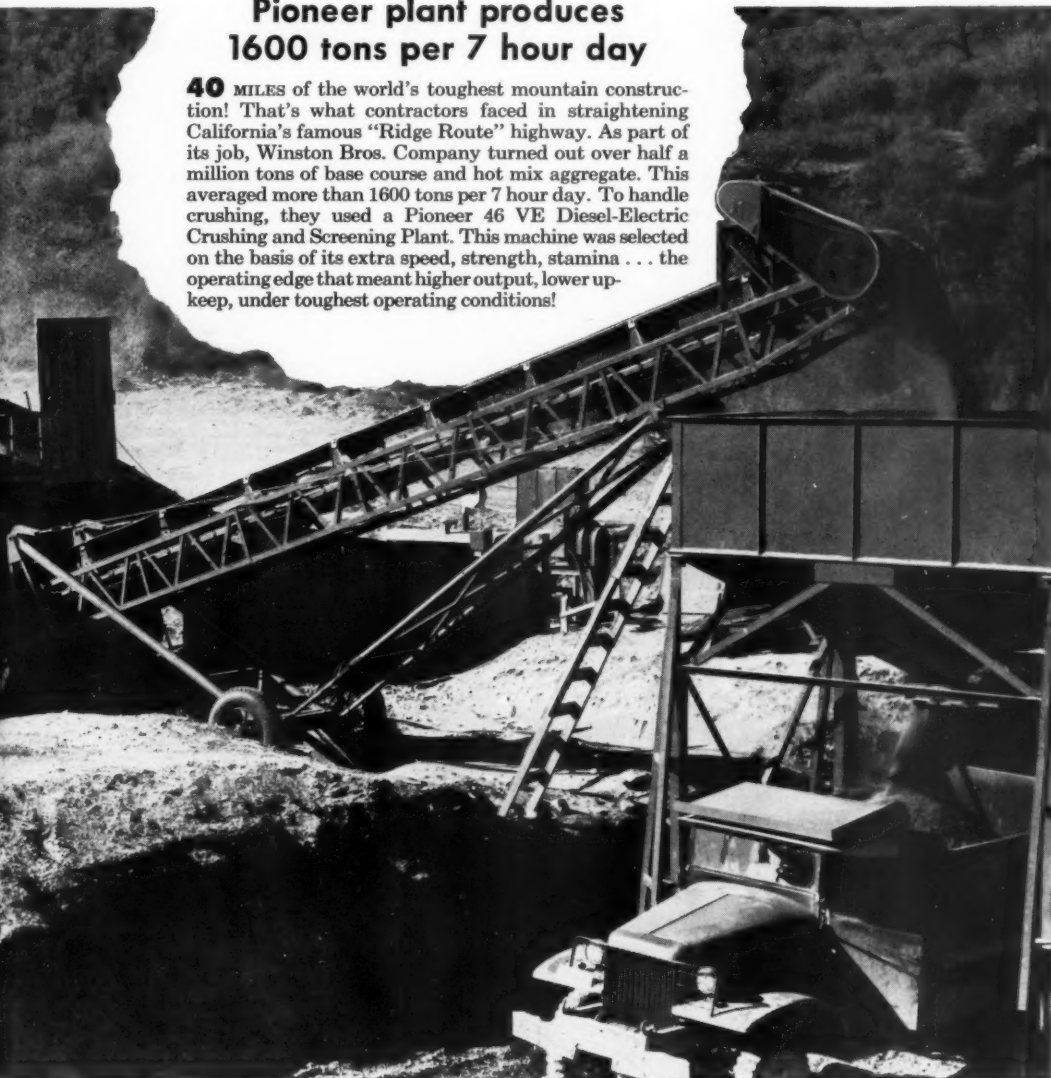


the bituminous plant, it runs an asphalt plant in Corning, N. Y., and an asphalt-storage plant in Penn Yan. Blades owns about 125 pieces of equipment which represent a \$500,000 investment. Radios make it possible for Bob and Lee, who are on the road most of the time, to contact each other, their superintendents, and the office and bituminous plant at any time during the day.

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Pioneer plant produces 1600 tons per 7 hour day

40 MILES of the world's toughest mountain construction! That's what contractors faced in straightening California's famous "Ridge Route" highway. As part of its job, Winston Bros. Company turned out over half a million tons of base course and hot mix aggregate. This averaged more than 1600 tons per 7 hour day. To handle crushing, they used a Pioneer 46 VE Diesel-Electric Crushing and Screening Plant. This machine was selected on the basis of its extra speed, strength, stamina... the operating edge that meant higher output, lower up-keep, under toughest operating conditions!



High-Water Switch

A new positive emergency alarm, critical to a 1/2-inch rise in water level, is manufactured by Automatic Control Co., 1005 University Ave., St. Paul 4, Minn. The Autocon Hi-Level safety switch is designed to operate either audible or visual alarms. Typical applications are for water tanks, rivers, streams, sumps, etc. The unit is entirely independent of all other control equipment. It is a nonfloat nonelectrode device and consequently is not affected by low temperatures and will not deteriorate, the manufacturer reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 132.

Traffic Warning Sign

A new A-standard traffic warning sign has been introduced by Eastern Metal of Elmira, Inc., Sign Division, 130 Harrison St., Elmira Heights 2, N. Y. As illustrated, the angle-iron frame opens into a wide base so that it won't blow over in strong winds or in the backwash of passing trucks. Two red flags mounted diagonally, plus a free-swinging yellow sign, are designed to command immediate attention. Several different legends are available and can be reflectorized with Scotchlite for added visibility. The sign and frame are painted with flexible baked enamel said to resist weather and bruises.

The A-standard folds up and locks in place for convenient carrying and storage. Flags are removable. The unit stands 27 inches high and is 18 inches wide. The company also makes a complete line of caution, safety, danger, and directional signs.

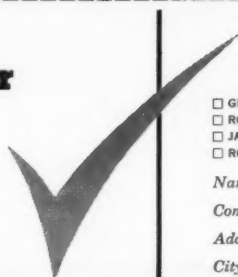
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 150.



Two red flags and a free-swinging yellow sign spell "Danger, Slow Up". The Eastern Metal warning sign has an angle-iron frame that opens into a wide base for stability.

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The operator who has an edge in equipment has a very definite advantage in bidding. Pioneer equipment gives you an operating edge over and above rated performance. Before you bid on your next job... check with Pioneer.



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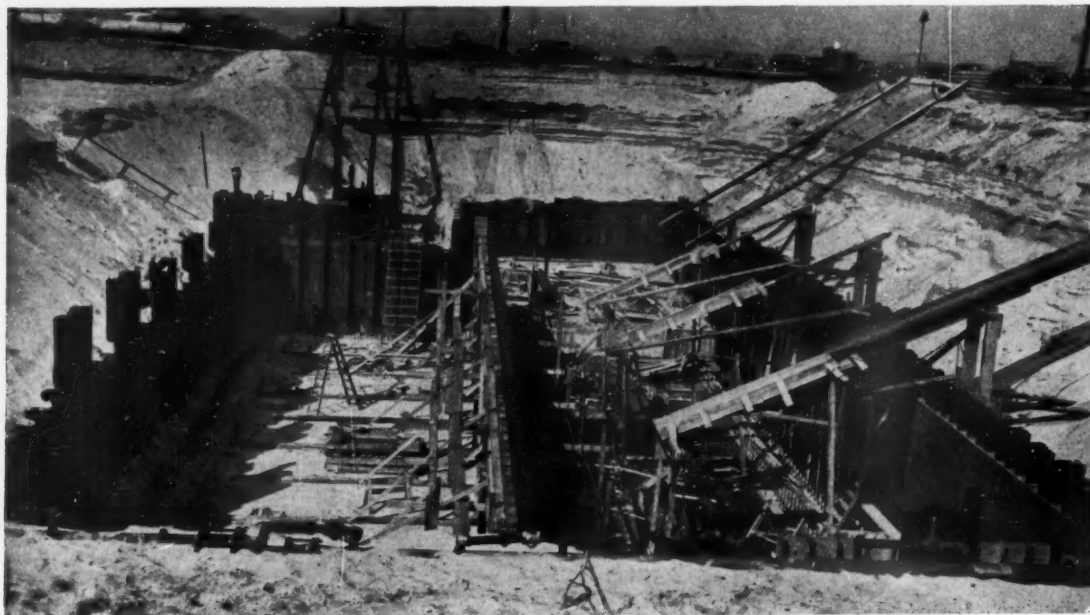
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Ground water was the main problem during construction of the Rockaway Sewage Treatment Works. Griffin wellpoint pumps in the background are at elevation minus 15 during second-stage dewatering of the pumphouse excavation. The pumps are shown close up in the photo at right.



New York City Gets a New Sewage-Treatment Plant

Built Between Bay and Ocean as Wellpoints Dewater Ground 30 Feet Deep, Permitting Use of Unbraced Steel Cofferdam



Part of the powerhouse foundation is supported on Monotube piles, shown here being driven by a Vulcan No. 1 hammer in the leads of a Bucyrus-Erie 41-B rig.

• A NEW sewage-treatment plant for New York City is being built under ground conditions that would make such work practically impossible, were it not for the installation of a comprehensive wellpoint system to eliminate ground water at the site. When completed early next year, the plant will be equipped to treat 15,000,000 gallons of sewage daily, serving the entire Rockaway Peninsula area in the Borough of Queens, which covers 4,736 acres with a population of approximately 90,000.

Provisions have been incorporated in the plant design for future expansion to a capacity of 30,000,000 gallons a day. Such enlargement would serve 180,000 persons, the estimated 1970 population of that area. This Rockaway pollution-control project will help cleanse the waters of Jamaica Bay, thus permitting the development of the shores and islands in that region, with bay-front beaches and recreational facilities included in such a program.

cilities included in such a program.

Construction of the Rockaway Sewage Treatment Works got under way in August, 1950, after the City of New York, Department of Public Works, awarded a contract to Merritt-Chapman & Scott Corp. of New York City on its low bid of \$3,248,966. The new facility is replacing two outworn plants, and is part of a five-year \$95,000,000 sewage-disposal program to clean up recreational waters around New York. By the end of 1953, it is expected that no raw sewage will empty into waters which are used for bathing, fishing, shellfish digging, or boating.

New Plant

The new plant on the long and narrow east-west Rockaway Peninsula occupies a block 600 feet square, bounded by Beach Channel Drive, Rockaway Freeway, B. 106th, and B. 108th Streets respectively on the north, south, east,

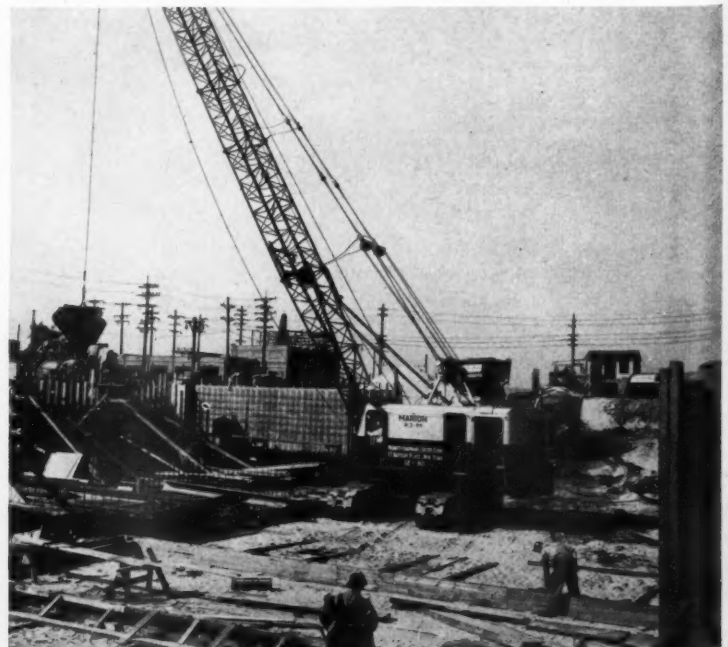
and west. Less than 300 feet north of the site is Jamaica Bay, while the Atlantic Ocean is only slightly farther away to the south. Designed by Metcalf & Eddy, a Boston firm of consulting engineers, in close cooperation with engineers of the Public Works Department, the sewage-treatment works includes a pump and powerhouse, grit-removal chambers, four covered digester tanks each 50 feet in diameter, four open aeration tanks, four closed sedimentation tanks with operating gallery, chlorine contact tanks, chlorine and sludge-storage building. The latter building lies across Beach Channel Drive, north of the block where the main plant is located.

Three small buildings—gas holder, digestion-tank control house, and main venturi and gas-meter house—are in the main-plant block. Intercepting sewers totaling 5 miles in length will bring sewage from all parts of the

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Looking east from the west end of the site, we see a Marion crane with an Insley bucket pouring the 16-inch foundation slab for the aeration tank.



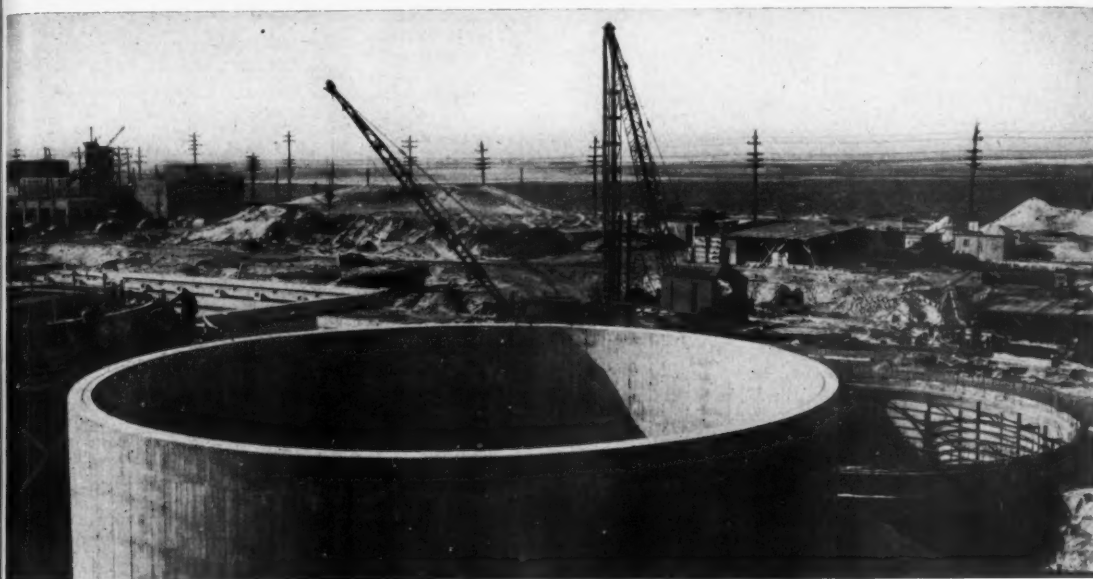
Here the Marion swings the Insley laydown-type concrete bucket over the forms for the walls of the sedimentation tank.

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C. & E. M. Photo

Here's a general view of the Rockaway Sewage Treatment Plant, with a digester tank in the foreground.

peninsula to the plant, where it will be treated by the high-rate activated-sludge process. After being screened and chlorinated at the chlorine contact tanks, the treated flow of liquid sewage will pass through a 60-inch outlet conduit at the northwest corner of the project into Jamaica Bay. Residue sludge or solids will be pumped from the sludge-storage building into tankers and disposed of at sea. A dock for these sludge boats along the bay at the north end of the site is included in the contract.

Methane gas, an important by-product of the sewage-treatment process, will be collected and used to fuel gas engines which will provide a good part of the power for plant operation. Surplus gas will be stored in a spherical gas holder for later use.

On Low Ground

Natural ground on this narrow barrier reef between bay and ocean is at elevation 5.0, with mean low water in the bay at 0.0. White sea sand extends deep into the earth below the level of the lowest foundation structure. Beginning in June, 1950, several small two-story frame buildings were razed at the site to permit the start of foundation excavation. The contractor graded the big square block down to 0.0 elevation with a pair of tractor-scraper units, stockpiling the sand for use later as backfill.

Ground water was encountered at 0.0, and dewatering of the ground was turned over to the Wellpoint Dewatering Corp., a subsidiary of Griffin Wellpoint Corp. of New York City. Wellpoints were installed first around the pump and powerhouse location at the east end of the site where the deepest foundation was required. A header line was laid out at 0.0 elevation enclosing the area, with 160 feet of pipe on the north and south sides, and 240 feet on the east and west sides. The sizes of header pipe decreased from 14-inch at the west side, where the pumps were located, down through 12-inch, 10-inch, and 8-inch on the east side where the header blanked out.

Risers 1½ inches x 21 feet were installed along the header on 4-foot centers on the north, east, and west sides, and on 2-foot centers at the south side nearest the ocean. The risers were jetted into position with a Griffin wellpoint jet pump operating at 225-pound pressure. Even in dry sand, more difficult than wet sand for jetting purposes, the 21-foot risers were sunk within 15 seconds each.

Excavating in the Dry

Griffin pumps for the first-stage dewatering were housed under an open-

side shed. Three pumps were used to lower the water table—a dual 8-inch pump with a 12-inch discharge, a 12 x 12, and a 12 x 10. All pumps were driven by GM 3-cylinder diesel engines. The pump and power setup for this first-stage dewatering was at 0.0 elevation. Two 1,000-gallon diesel fuel tanks were located just above the pumps at ground level so that the fuel flowed by gravity into 50-gallon drums alongside the engines.

After this area was dewatered from 0.0 down to minus 15 elevation, the 12 x 10 pump was taken off the header line, the 12 x 12 unit was kept in reserve as a standby, while the water level was maintained with the twin 8-inch pump. Then the site was excavated to minus 15 totally in the dry by a Marion 93-M dragline equipped with a 70-foot boom and a Page 2½-yard bucket. The rig worked around the top edges of the hole, loading the sand out into trucks which hauled it away to disposal areas. At minus 15, water was

(Continued on next page)

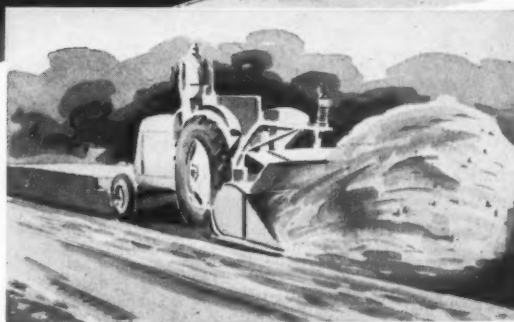
That's what a contractor

said to one of the SEAMAN field engineers while they were watching the SEAMAN MIXER at work on a bituminous highway job. And the contractor was right! Because the SEAMAN aerates as it mixes. Solvents rapidly evaporate and the "set" is greatly hastened. That's an advantage found only in the SEAMAN.

But more than that the SEAMAN is a "full-depth" MIXER. It mixes thoroughly, completely and positively to the full depth specified. The secret of full-depth mixture of binder with the proper distribution of coarse and fines is in the forward "spillover" of materials ahead of the mixing rotor and the constant re-mixing as the SEAMAN moves ahead.

And these are but two of many reasons why only the SEAMAN method gives the roadbuilder a complete mix together with a highly profitable versatility and efficiency in production for far less investment and operating cost.

The new, 1951 edition of "Soil Stabilization Methods" is off the press. Completely revised and enlarged, 100 pages of pictures, diagrams and practical construction information. It's FREE. Just ask for Bulletin 25. Write today.



The SEAMAN Motor-Mixer in a hood open operation to dehydrate wet aggregates.



The SEAMAN Self-Propelled (left) is a complete mixing unit which offers full 360° operator visibility and accurate control of the mix. It also frees a critical tractor for other work.

The SEAMAN TRAY-L-PLANT (below) offers all the advantages of the Self-Propelled unit. It is equipped with tachometer assembly and a volumetric meter is available for the closely controlled application of bitumen. Water also is readily applied.



SEAMAN MOTORS, INC.

282 No. 25th Street,

Milwaukee 3, Wis.

New York City Gets A New Sewage Plant

(Continued from preceding page)

again encountered.

Steel sheet piling, Bethlehem MZ-38 sections in 30-foot lengths, were driven to enclose the pump and powerhouse site in a cofferdam 60 x 135 feet. Driving was done by the crane using a McKiernan-Terry 9B3 air hammer powered by a Le Roi 600-cfm compressor. After driving, the top of the cofferdam was at minus 15 elevation and the bottom at minus 45. This insured an average 15-foot clear penetration into the lower strata of sand after the excavation was carried down to minus 30 elevation.

Second-Stage Dewatering

Directly behind the top of the cofferdam, a second-stage dewatering system was installed with the header line and pumps at elevation minus 15. Three 12 x 10 pumps discharged through reduc-



C. & E. M. Photo

Concrete for the Rockaway Sewage Plant is discharged from a Jaeger transit-mixer, on a 10-wheel Federal diesel truck, into an Insley 2-yard laydown-type bucket.

ers to three 8-inch lines that emptied into a 14-inch discharge line at elevation 5. Header line for this second stage totaled 326 linear feet of both 10 and

8-inch pipe, with risers 1½ inches x 21 feet on 2-foot centers. Once the water level was lowered, two pumps were kept running to maintain that level while the third was held as a standby. The 14-inch line carrying discharge water from the hole consisted of extra-heavy-duty pipe, with either 5/15 or ¾-inch walls. The pipe lengths were welded together and laid under Beach Channel Drive, continuing north to empty into the bay.

The remainder of the excavation down to minus 30 was then completed in the dry, but the drag bucket was removed from the Marion crane and the digging was done with a Haiss 2-yard clamshell. Again the excavated sand was hauled away in trucks. Of the 15,000 cubic yards excavated at the pump and powerhouse location, about 10,000 yards was removed by the drag bucket and 5,000 yards by the clamshell. Outside the cofferdam, the banks were laid back on a 1 to 1 slope from minus 15 up to 0.0 elevation. Thus on top the big hole measured approximately 215 x 140 feet.

While this excavation was in progress at the east end of the site, another header line was laid out for dewatering the remainder of the area to the west. This header, also at 0.0 elevation, enclosed the irregularly shaped outline of the digestion tanks, sedimentation and aeration tanks, and grit chambers. Altogether 1,980 linear feet of header, from 8 to 14-inch size, was installed at 0.0 elevation. The north line of header pipe was only 242 feet from the bulkhead line of the bay.

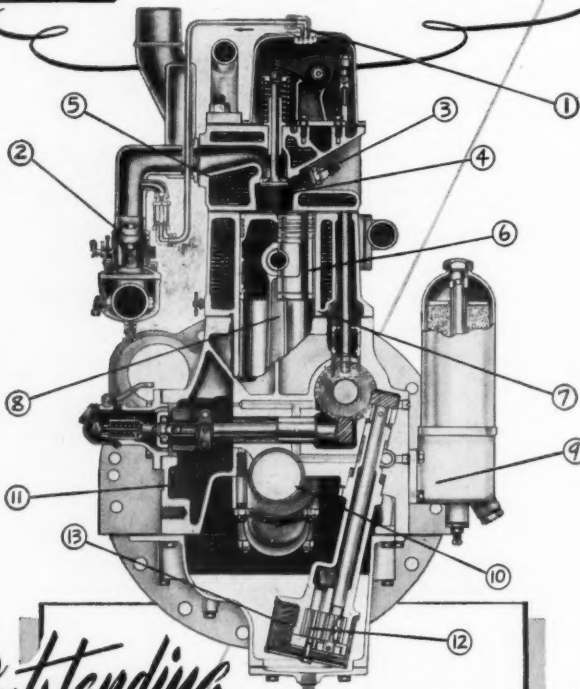
Reinforced-Concrete Structures

The deep hole for the pump and powerhouse at minus 30, or 35 feet below ground level, was dry enough due to the wellpoints that the steel sheet cofferdam held without bracing. Actually the ground was dewatered down to approximately minus 31.3, or 1.3 feet below job requirements. The pump and powerhouse, with its wet well, is the largest building of the plant. It has three levels, and like the other structures in the works is built of reinforced concrete. Above the foundation level there is some brick trim. At the western half of the site, the average depth of foundation goes down to only minus 10. Part of this foundation is supported by Monotube piles 12 inches in diameter x 30 feet long, which were driven with a Vulcan No. 1 hammer. The casings are filled with concrete.

Foundation slabs and walls for the pump and powerhouse were poured first, before starting work on the structure. (Concluded on next page)



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PHOENIX PRODUCTS CO. Metal Spinning Div.

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Milwaukee 16, Wis.

ures to the west. In places these slabs are 4 feet thick, with the walls averaging 12 to 18 inches, and in a few locations up to 7 feet in thickness. Slabs for the tank structures average around 16 inches in depth. Altogether, 18,000 cubic yards of concrete and 800 tons of reinforcing steel are required in the construction of the plant. Total excavation approximated 50,000 cubic yards.

Reinforcing steel for the job was delivered by truck from the Long Island City warehouse of Jones & Laughlin Steel Service, Inc. It was shaped on the site by an Alamo rod-bending machine. Wooden forms for the concrete pours were built on the job. Typical forming consisted of 3/4-inch plywood facing, backed with 2x6 studs on 14-inch centers, and double 2x6 or 2x8 wales on an average 24-inch spacing. Richmond ties held the panels together. In building the forms the carpenters used a Mathiesen band saw, a DeWalt table saw, and several assorted smaller portable electric saws.

Concrete Placing

Ready-mix concrete for the project was furnished by the Colonial Sand & Gravel Co. from its Cedarhurst, Long Island, plant. It was delivered by truck mixers, generally Jaeger 9-yard units mounted on Federal 10-wheel diesels, after a 12-mile average haul. At the site, part of the concrete was chuted directly into the forms where this was possible. The bulk of the concrete, however, was emptied out into Insley 2-yard laydown-type concrete buckets which were then picked up by crane and discharged over the forms. The Marion 93-M crane was fitted out with a 100-foot boom for concrete placing. A Bay City crawler crane with a 60-foot boom also placed concrete, working with Insley 1-yard buckets.

In addition to the wellpoint layouts described above, two other header lines with risers were installed on the site. One line ran north along the west side of the plant to dewater the ground for the outfall-pipe trenching. The other line extended to the northeast corner of the area to permit excavation for the sludge-storage building. When pumping first started, the water came clear and sweet. Before long, however, it turned brackish and salty, indicating seepage from the bay as the water table was lowered.

Merritt-Chapman & Scott Corp. employs an average force of 110 on the project. Key personnel includes Norman Eastwood, Project Manager; John Hogan, Superintendent; Edward J. O'Brien, Engineer. Pete Loscalzo was Foreman for the Wellpoint Dewatering Corp.

Premeasured Rope

According to The New Bedford Cordage Co., Ash St., New Bedford, Mass., its sisal rope is now receiving the same "face-lifting" treatment as its



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manila. The sisal rope is measured at the factory and marked in red at 10-foot intervals. Markings also serve as brand identification.

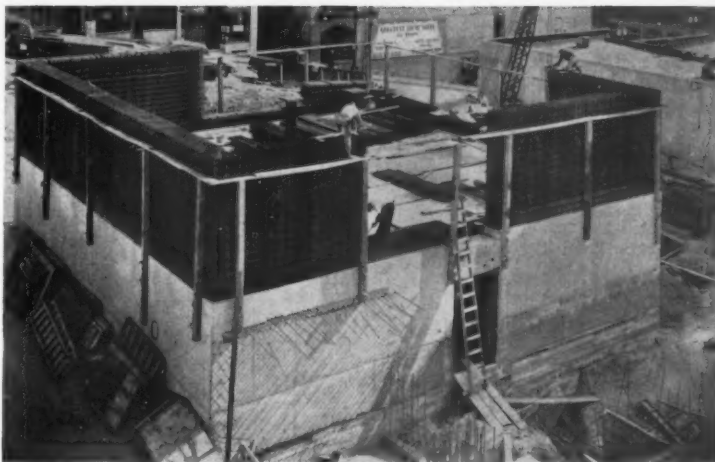
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 186.

Bucket-Loader Catalog

A 24-page bulletin describing the Haiss Models 80 and 135 bucket loaders is available from George Haiss Mfg. Co., Inc., 141st to 144th St. on Park Ave., New York 51, N. Y. These units have a rated capacity of 5 and 8 cubic yards per minute, respectively. Both are available with wheel or crawler mountings.

The bulletin includes data on loading costs and detailed descriptions of the power plant, transmission, hydraulic units, crawler tracks, swivel chutes, belt conveyor, and other parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 197.



When the Federal Reserve Bank of San Francisco built a new vault for its Seattle, Wash., branch, it reinforced the concrete with Steelcrete expanded-metal sheets. Here, concrete is already in place on the lower level. On the second level, the Steelcrete is placed vertically to form a honeycomb into which the concrete will be poured. The wall will resist drill, cutting torch, chisel, or explosion. Wheeling Corrugating Co. of Wheeling, W. Va., makes Steelcrete.

The lightweight G-150 WAGON DRILL, designed for use with CP 59-pound Sinker or 3-inch Drifter, drills to depth of 20 feet or more, vertically, horizontally, or at any angle. Write for copy of SP-3010 for full description.



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CP PORTABLE COMPRESSORS, notable for dependability, low maintenance; available in gasoline and Diesel driven models, 60 to 600 c.f.m. CP Gradual Speed Regulator minimizes engine wear, saves 15% to 35% in fuel.

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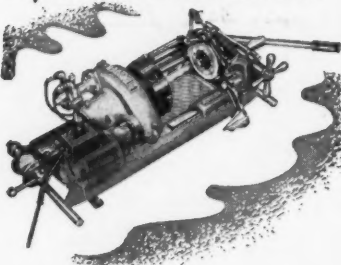
The Comet Timber Cutter is a radial-arm saw that will cut off or miter timbers up to 17 x 17 inches.

New Radial-Arm Saw Cuts Heavy Timbers

A large radial-arm saw which will cut off or miter construction timbers up to 17 x 17 inches has been introduced by Consolidated Machinery & Supply Co., Ltd., 2031 Santa Fe Ave.,

- LIGHTWEIGHT
- LOW-PRICED
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the New Beaver Model-E Pipe and Bolt Machine



The new low-priced, lightweight Beaver Model "E" is a "junior edition" of the heavy-duty Beaver Model A—which has, for the past 20 years, been the recognized leader in the field of portable pipe and bolt machines.

The Model "E" uses the same dieheads—the same dies—the same patented interchangeable wheel-and-roller or knife cutoff devices—the same reamer arm and cone—as the Models A and B. This will be a great advantage to thousands of shops now equipped with the Beaver Model A or B because it eliminates the necessity of carrying in stock duplicate dies and parts—thereby preventing endless confusion and needless expense. And remember, there are 195 different kinds and sizes of dies instantly available for Models A, B or E.

Although designed primarily for hardware stores and small piping contractors, BIG contractors will find the new Model "E" useful on jobs requiring extreme portability.

A pipe machine is no better than the service back of it and our 50 years of experience in this field, and our reputation for high quality and friendly service, is your best guarantee of complete satisfaction.

Write for new illustrated operating guide entitled "Operating 'Hints' For Your Portable Pipe Machine and Hand Pipe Tools."

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Los Angeles 21, Calif. The Comet Timber Cutter was designed primarily for mining, bridge building, shipbuilding, and other heavy construction work. Cutters are available in three sizes with 7½ or 10-hp, 1,800 or 1,200-rpm, 220/440-volt motors that swing blades up to 44 inches in diameter.

The saw assembly is mounted on a rigid arm of hardened-steel tubing supported by an adjustable steel column. Eight ball-bearing rollers allow the saw to move forward and backward on milled tracks in this arm. These are totally enclosed and sealed from dirt and dust by felt wipers. Adjustment for depth of cut is made through a screw-gear device which raises or lowers the column. The controls for depth of cut are at the front of the machine. Adjustment for miter is made by rotating the column to the desired angle. Width of cutoff is controlled by a manually operated chain drive attached to the saw assembly.

Comet Timber Cutters are mounted on heavy structural-steel tables with wooden table tops. Roller tables and adjustable steel back fence (as illustrated) are also available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 152.

Brush-Cutting Machine Works in All Positions

Literature on two brush-cutters, one for roadside maintenance, the other for land clearing, is available from Hall Machine & Iron Works, Inc., Sedro-Woolley, Wash. The first unit, the Model AR-4, is mounted on a pneumatic-tired chassis for road work. The Model TM-1 is a tractor-mounted crawler unit which may be used for clearing right-of-ways, irrigation or drainage ditches, etc.

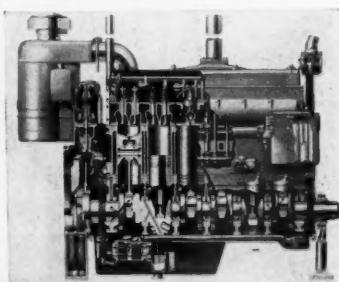
The 16-page bulletin is fully illustrated and describes both machines in detail. Their main features are pointed out on schematic diagrams. Complete specifications are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 175.

Two New Power Units

Two new industrial diesel engines, the D337 and D326, are scheduled for production by Caterpillar Tractor Co., Peoria 8, Ill. The 6-cylinder D337 is an industrial version of the 5½ x 6-inch engine developed as a power source for the DW20 and DW21 tractors. It is rated at 250 hp at 2,000 rpm, intermittent rating. The D326, similar in design, is rated for 170 hp at 2,000 rpm, intermittent rating. The two models feature fuel pumps mounted adjacent to the cylinders they serve. This results in standard, identical, short fuel lines for each cylinder.

A new oil-cooled-piston arrangement has been used on the D337 and D326. The pistons, which have an iron band cast integrally for the upper ring groove, are cooled by an oil stream sprayed from a nozzle attached to the engine block. Since this spray lubricates the piston pin as well as cooling the piston, oil holes are not required in the connecting rods.



A longitudinal cutaway of the Caterpillar D337 diesel engine showing fuel pumps adjacent to each cylinder.

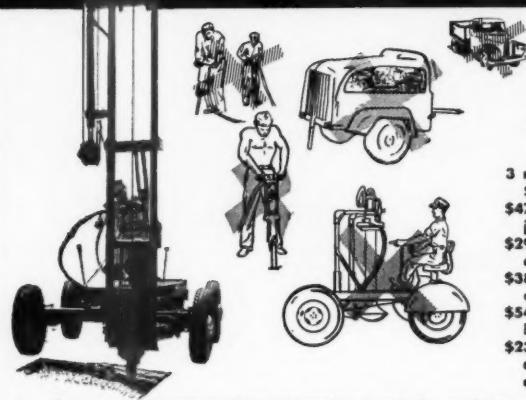
Fine filtration elements filter the full flow of lubricating oil to the engine system. The oil passageways are protected from dirt and foreign material while filter elements are being changed. Sludge will collect at the bottom of the filter cans where it cannot enter the oil passageways or relief valves.

A newly designed 25-hp vertical gas-

oline starting engine is used with the D337 and D326 engines. Crank throws adjacent to each other for even firing, an up-draft carburetor for easier hot starting, and a wet-type clutch make starting easy, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 203.

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Save time and money on labor and equipment with the revolutionary Ottawa Self-Propelled Hydra-Hammer. No skilled operators needed for this multi-purpose tool, any man able to drive a truck can learn to operate the Hydra-Hammer in an hour.

The Hydra-Hammer travels under its own power up to 12 MPH. Converts from travel to work position by elevating the tower and shifting gears. No extra engine or hose couplings to slow production. The 400-pound hammer falls free, eliminating shock and high maintenance costs.

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Here is a McKiernan-Terry Pile Hammer in action driving steel sheet piles into the ground as one of the first steps in the construction of a \$13,000,000 Research Hospital for the Veterans Administration, Chicago. Contractors were the W. E. O'Neil Construction Company and the Kenny Construction Company.



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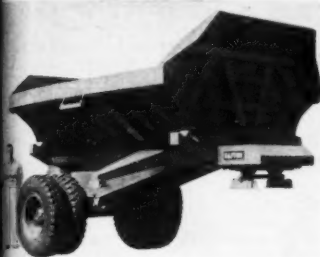
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Easton TP side-dump trailers are now available in 14, 17, and 20-ton capacities. They may be dumped to either side, and the bodies may be reversed to prevent excessive wear on one side.

Side-Dump Trailers; Capacity to 20 Tons

New and improved models of the TP side-type trailers, with a 12 per cent increase in water-level capacity, have been announced by Easton Car & Construction Co., Easton, Pa. Available in 14, 17, and 20-ton capacities, these units may be dumped to either side and bodies may be reversed end-to-end to prevent excess wear on one side. The trailer is furnished with one bolt-attached stabilizer arm, interchangeable from side to side depending upon the direction of dumping.

Load distribution has been improved to place more load on the fifth wheel, thus providing better traction on the tractor axle. The TP trailer is furnished as a complete unit, with an Easton permanently coupled rubber-mounted fifth wheel, with mounting brackets and bolts. Mounting plates for the fifth wheel and tractor-frame cover plates with attachments are available as extras. An SAE king pin and skin plate, including an automatic-type fifth wheel, may be furnished.

The all-welded body design features stronger edge construction. Box-section reinforcements are used throughout. A 3-inch oak floor cushion and replaceable carbon-steel liner plate protect and reinforce the body floor. To protect the sloping sides of the body in handling heavy and abrasive material, replaceable side liner plates may be specified. For extremely severe service, all liner plates may be of heat-treated alloy steel.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 214.

Stabilizes Ladders On Uneven Surfaces

A stabilizer designed to make any ladder "sure-footed" on irregular or slippery surfaces is now being distributed by Mine Safety Appliances Co., Paddock, Thomas and Meade Sts.,



A steel attachment for the lower end of straight or extension ladders makes them sure-footed on uneven surfaces. It is called the Hydra-Lizer and is a product of Mine Safety Appliances Co.

Pittsburgh, Pa. The Hydra-Lizer is an adjustable steel attachment for the lower end of straight or extension ladders. It consists of two steel legs which act as plungers in vertical tubes attached to the lower ends of ladder rails. The swiveled shoes on the legs are made of hardened-steel plate $3\frac{1}{2}$ inches in diameter and have grooved rubber and cord soles $\frac{3}{8}$ inch thick which grip most hard surfaces. For ice, soft ground, or slippery asphalt, the steel plate has four sharp teeth which, when the shoe is rotated and turned flat to the ladder rails, dig into the surface.

The tubes which house the legs are cross-connected near their upper ends by steel telescoping valve tubes leading to a central valve block. The valve assembly adjusts to any ladder width between 17 and 29 inches, and fits straight as well as flare-base ladders. The entire assembly is filled with oil above the plungers. Opening the valve by means of a spring-loaded lever permits oil to move from one side of the system to the other. When one leg moves up to adjust itself automatically to a difference in level, the other leg moves down a corresponding distance. When the valve is closed, the system is locked so that neither leg can move farther into its vertical tube. Loads up to 1,000 pounds are supported by the assembly, the manufacturer reports.

Steel angles are attached to the vertical tubes for bolting the Hydra-Lizer to ladder side rails. The entire assembly is fabricated of precision-machined steel parts, sealed and fused by furnace brazing.

Further information on the Hydra-Lizer may be secured from the company. Or use the Request Card at page 16. Circle No. 184.

Booklet on Wall Forms

An 8-page revised directions booklet on Symons wall forms is offered by Symons Clamp & Mfg. Co., 4251 Diversey Ave., Chicago 39, Ill. It supplies details on panel alignment, stripping, spacing of ties, safe work loads for ties, and the pressure per square foot that the forms will stand. The booklet gives tips for getting the best performance and longest use out of Symons forms, and lists the accessories available.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 139.

Improved Truck-Mixer Line

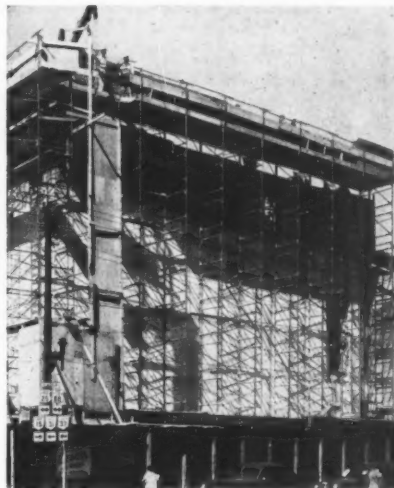
A new bulletin on the complete line of improved Rex Hi-Discharge Moto Mixers is distributed by Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis. It illustrates and describes in detail the improvements: a newly designed chain drum drive system; drop-

forged and flame-hardened drum rollers; a drum track of the locomotive-type shrunk over pads welded onto the drum; a relocated water pump with its drive simplified for easy maintenance; and new spouting equipment.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 187.



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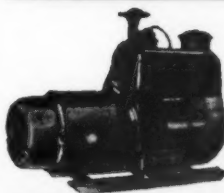
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8 separate hydraulic controls give operator push-button action on steering, depth, leveling, tail support, wing angle, and spoil wings. Operates smoothly in water, thick brush, or heavy soil.

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took it all ... with
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We own and use 5
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laterals ... which have
cut costs for us.
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General Manager
Dept. C-3

E. V. BRISCOE & SON KERMAN CALIFORNIA

Annual Road Costs: How to Figure Them

Such Cost Data Are Invaluable in Planning and Programing Roads for Maximum Service at Minimum Cost

• ONCE a highway has been built, it generates a demand upon current revenue for maintenance and operation, and upon future revenue for rebuilding and modernization. To meet these demands with a plan that will provide maximum service at minimum cost, it is essential to know your annual road costs.

A procedure for determining them is explained in the April, 1951, issue of *Public Road*, Volume 26, No. 7. The material was compiled by the Financial and Administrative Research Branch of the Bureau of Public Roads, and is reported by Harold W. Hansen, Highway Engineer. The procedure was discussed with officials of more than 20 states. It was also discussed by the Highway Research Board Committee on Highway Costs at the 1948 and 1949 HRB meetings.

Many state highway departments, writes Mr. Hansen, have established highway control sections in recent years. One objective is to bring together cost data on construction, maintenance, and operation as a basis for determining annual road costs. Such a determination is invaluable in long and short-range planning and programing.

The term "annual road cost" as he uses it in his discussion refers only to the actual or estimated annual depreciation charge plus the annual expenditure for maintenance and operation. It does not include other elements of highway cost such as interest, taxes, and the like. These may, of course, be included—depending on the use to be made of the cost information.

Depreciation

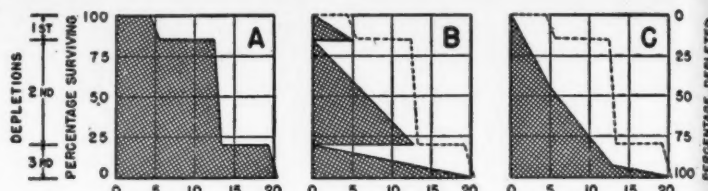
The "depreciation charge" is a measure of the annual capital—or construction—cost of the control section. There are many formulae for computing depreciation, but the straight-line method is in almost universal use in this country.

In this method, funds which have

been spent for the construction of a highway are subdivided into "fixed-asset accounts". Eight of these have been recommended by the Subcommittee on Uniform Accounting of the American Association of State Highway Officials: (1) right-of-way, (2) roadway and drainage grading and earthwork, (3) drainage structures and roadway earthwork protective structures, (4) roadway surface and base (by the type of roadway surface), (5) improved shoulders and approach surfacing, (6) bridges, viaducts, grade-

separation structures, and tunnels (by individual structures), (7) traffic and pedestrian services, and (8) roadside development.

Certain basic information is required for each control section: date and cost of construction (by fixed-asset accounts), the amount depleted—or, conversely, the amount salvaged—at the time of each subsequent reconstruction, the age at time of reconstruction, etc. From this information, a mortality study of the highway can be graphed, as shown in the accompanying illustration.



The base line of these graphs shows the age in years of a highway fixed asset. The vertical line shows the percentage of the original investment surviving at the time of each reconstruction. The three graphs show the steps involved in deriving the straight-line depreciation curve.

tion. In Figure A, you will notice, the percentage of the original investment surviving at $\frac{1}{2}$, $1\frac{1}{2}$, $2\frac{1}{2}$, etc. years of age has been plotted. Then these points have been connected with straight lines. The "curve" that results shows the survivor history of the capital invested in a given year to construct one of the fixed assets. From graphs prepared for each of the fixed assets, we can build up the total annual depreciation charge for the control section.

(Concluded on next page)



DARAKOTE anti-stripping additive makes it possible for liquid bituminous materials to adhere to wet, moist or dry aggregates... prevents stripping under adverse conditions of moisture and low temperature. **DARAKOTE** actually displaces water, permanently binds asphalt to the aggregate and to the road surface.



SURFACE TREATMENT

With **DARAKOTE**, surface treatment goes on uninterrupted, rain or shine, no matter if aggregate and old road surface are drenched, damp, or bone dry.



ROAD MIX

With **DARAKOTE**, less blading and mixing is required—often aerating and drying out windrows is accomplished in half the time. Demurrage and standby time is reduced.



TRAVEL PLANT MIX

DARAKOTE adds working days to your paving season. Asphalt maintenance and paving programs continue as scheduled, costly delays are eliminated.



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All widths, lengths, and thicknesses; accurately punched to fit your make of machine.

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Depreciation Rate

In the example shown, there were three reconstructions—one 5 years after the initial construction, one 13 years after, and one 20 years after. The portion of the original investment lost at the time of each reconstruction is referred to as the "depletion". In the method Mr. Hansen discusses, each of these depletions is treated as a separate unit and the rate of depreciation for each is found. Then the several rates are added to give the total rate of depreciation for the fixed asset. This is known as the "unit summation method" for applying the principle of straight-line depreciation to a property group made up of units having different service lives.

Figure B illustrates the first step: determining the rate of depreciation for each depletion. The first reconstruction, you notice, caused a depletion of 15 per cent of the fixed asset. Since that reconstruction came 5 years after the initial construction, the 15 per cent is depreciated over the 5 years to give an annual rate of 3 per cent. Similarly, the second depletion of 65 per cent must be depreciated over a 13-year period, or at an annual rate of 5 per cent. And the third depletion of 20 per cent is depreciated over 20 years, or at 1 per cent per year.

The way these rates are combined to yield the resultant rate for the fixed asset is illustrated in Figure C. For the period from age zero to age 5 years, the three separate rates of depreciation (3, 5, and 1 per cent) are added, giving a total rate of depreciation of 9 per cent a year. For this 5-year period, then, the total depreciation was 5 multiplied by 9, or 45 per cent.

From age 5 years to age 13 years, two separate rates (5 and 1 per cent) are added to obtain the total rate of depreciation of 6 per cent per year. This was an 8-year period, so 8 multiplied by 6 gives 48 per cent total depreciation.

In the final period, from age 13 years to 20 years, the total rate of depreciation was 1 per cent per year. This was a 7-year period, so the total depreciation was 7 multiplied by 1, or 7 per cent. The grand-total depreciation for the three periods (45, 48, and 7 per cent) is 100 per cent of the original amount.

(Of course, the situation illustrated is not typical. Normally not all of the original fixed asset is depleted; much of the original investment in roadway and drainage grading and earthwork, for example, remains. For this undepleted capital it is necessary to estimate the remaining life expectancy. Such estimates may be obtained by analyzing construction investment requirements, a phase of road-life studies being conducted by state highway-planning surveys in cooperation with the HRB.)

The share of construction costs which may properly be charged to a control section during a given year is found by adding the depreciation charges which have been computed for that year for all improvements built within the control section. These figures in turn are made up of actual or estimated depreciation charges for the individual fixed-asset accounts comprising the improvement, in accordance with the methods outlined.

Forms for Computations

Simple well designed forms can ease the task of computing and summarizing depreciation data for control sections, Mr. Hansen said. He recommended forms which show depreciation as an annual charge on a per-mile basis for any selected segment within the control section and for the control section as a whole; this makes it easy to compare the cost of one section of road with the cost of any other. Suitable forms also provide for adjusting depreciation charges to a common price

level so that all costs may be expressed in terms of dollars with approximately the same purchasing power.

The Annual Road Cost

The annual road cost per mile for the control section is obtained by adding the total annual depreciation charge per mile and the corresponding maintenance and operation expenses per mile.

These expenses are easily ascertained by states that have established control sections, since obtaining such data is one of the basic functions of the control-section procedure. Maintenance and operation charges, too, should be adjusted by means of a maintenance price index to a common price level, said Mr. Hansen. And the

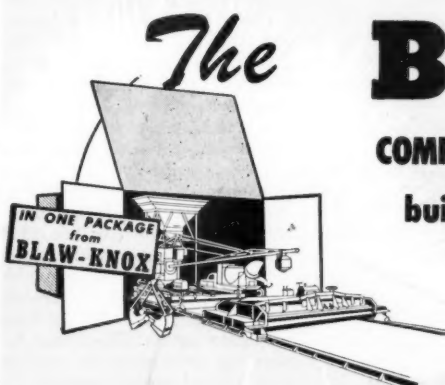
same base periods should be used for both the construction and maintenance price indexes. Here, too, simple well designed forms for summarizing depreciation charges and maintenance and operation expenses should be used. Mr. Hansen advised that at the bottom of such a form, space be left for special computations such as the cost per vehicle mile. He also suggested that averages for a group of years sometimes prove more useful than annual costs. Trends show up clearly in such averages, and data arranged this way are useful for general administrative purposes.

Insure your own personal security and that of the nation by regular investment in U. S. Savings Bonds.

Masonry Anchoring Devices, Drills, and Allied Products

A 22-page catalog of masonry anchoring, fastening, drilling, and allied products is now available from U. S. Expansion Bolt Co., 619 State St., York, Pa. The new thumb-indexed booklet illustrates and describes machine-bolt expansion shields and anchors, caulking tools, machine-screw anchors, lag-screw expansion shields, wood-screw anchors, nail anchors, wire-rope clips and thimbles, toggle bolts, turnbuckles, and many masonry drill tips. Merits of the products, and sizes are included.

This literature may be obtained from the company by requesting Catalog No. 121, or by using the Request Card at page 16. Circle No. 130.



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COMPLETE PACKAGE of concrete paving equipment
builds the country's superhighways and airports

ALL over the country, contractors working the big contracts like Edens Superhighway or the Pennsylvania Turnpike are utilizing the advantages of the one-source "Complete Package" of concrete paving equipment.

Here's how the Blaw-Knox "Complete Package" simplifies your problems and adds to your profit. You get every single piece of equipment you need for the job, and each piece is matched to the others to give you the assembly-line production that keeps you ahead of schedule.

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When so many contractors are profiting with "package" equipment, why don't you make sure of the bidding advantages you get with the Blaw-Knox "Complete Package"? Ask your Blaw-Knox distributor for details today.



Blaw-Knox Subgrader rides on Blaw-Knox Steel Road Forms on the Taconic Parkway job near Poughkeepsie, New York.



Blaw-Knox Paving Spreader and Finishing Machine at work on Edens Superhighway between Chicago and Milwaukee.



Steel Curb and Gutter Forms. One set handles every curb, curb and gutter, integral curb or side-walk job.



Blaw-Knox Clamshell Buckets are available in a size and type to fit your job.



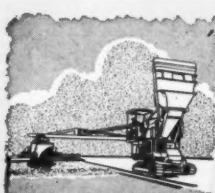
Blaw-Knox Steel Road Forms are self-aligning, easy to set and strip.



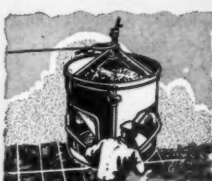
Blaw-Knox Portable Aggregate Batching Plants and Portable Bulk Cement Plants on the Pennsylvania Turnpike.

BLAW-KNOX

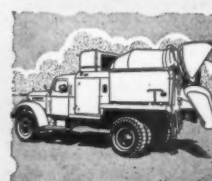
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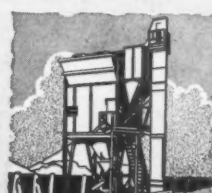
MultiFoot Paver



Concrete Bucket



Hi-Bay Truck Mixer



Truck Mixer Loading Plant

New Valve Actuators

New valve actuators designed for operating gate valves, plug valves, dampers, diaphragm valves, butterfly valves, and sluice gates have been introduced by Ledeen Mfg. Co., 1602 S. San Pedro St., Los Angeles 15, Calif. They are basically Ledeen cylinders

equipped with brackets, valves, controls, and couplings to make them suitable for the type of operation required. The manufacturer reports that they can be adapted to any make, size, and type of valve; to operate against any line pressure; to work on any fluid medium, and with any pressure available. They can be arranged for on-

and-off service, or for positioning service.

Bulletin 512, showing typical valve-actuator circuits and capacities, and giving details on construction, application, and control, may be secured from the company. Or use the Request Card at page 16. Circle No. 164.

essential ratings.

Further information may be secured from the company by requesting Catalog C72-51. Or use the Request Card at page 16. Circle No. 190.

Data on Masonry Cutting

Practical, illustrated instructions on how to figure blade costs in masonry cutting are contained in a booklet prepared by Eveready BrikSaw Co., 1509 S. Michigan Blvd., Chicago 5, Ill.

The booklet describes simple blade-cost-analysis tests which an operator can run before starting the job. It gives directions for selecting the correct abrasive or diamond blades for use on different materials. It describes the blade-manufacturing process and tells how many cuts can be expected from a blade under various conditions. The booklet also tells how to make special or duplicate cuts with a masonry saw.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 208.

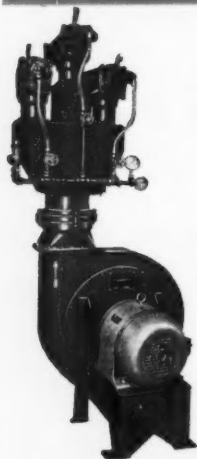
Safety in Afghanistan

Job safety is a problem everywhere construction goes on. And special problems arise in various localities. The latest issue of "Em-Kayan", the monthly magazine of Morrison-Knudsen Co., Inc., mentions the company contracts in Afghanistan, and tells how Ted Y. Johnston, Project Manager, is solving his unique safety problem.

The language difficulty is overcome by wire recorders and loudspeaker systems. Talks on safety in the native language are recorded and played in the company camps. Johnston has his Afghan foremen hold regular safety meetings, and he makes wide use of cartoons. The loose clothing of the Afghans and their lack of fear are the biggest hazards which the safety program combats.

HOPKINS Gives You

- ★ More Tonnage
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- ★ "Job-proven" Equipment



Hopkins Volcanic Dryer Unit

- Contractors throughout the country have learned that Hopkins' low pressure burning equipment steps up production, provides greater efficiency, and reduces fuel costs.

Hopkins makes the only complete "package unit" combustion system for asphalt plants—easy to install and operate, dependable, efficient, and adaptable to any dryer size or design. Why not get these money-saving advantages for your asphalt plant? Write today for literature and complete details.

Hopkins' Volcanic Specialties, Inc.

Alliance, Ohio



With a LITTLEFORD "Kwik-Steam" Vapor Generator for PILE DRIVING

Here's the labor-saving unit contractors have been looking for. Gives steam in 2 minutes time from a cold start, burns low-cost fuel oil, needs no skilled workman to operate it. This amazing unit cycles off and on to produce steam only when needed. There's no hard fuels to buy, no firing boilers for hours before operation. The "Kwik-Steam" Generator is the most modern steam producing unit ever designed. For Pile Driving, Heating Asphalt Plants, Curing Concrete Blocks, Heating Aggregate in Ready Mix Concrete Plants are a few uses for this versatile "Kwik-Steam" Generator. Made in sizes ranging from 20 to 165 B.H.P. Write for Catalog 22 for further details.



LITTLEFORD

LITTLEFORD BROS., INC., 485 E. PEARL ST., CINCINNATI 2, OHIO

Power Transmission By New Chain Drive For Top Speed, Load

A new departure in power transmission by chain drive has been developed by Morse Chain Co., 7601 Central Ave., Detroit 8, Mich. Featuring entirely new design principles, the Hy-Vo (high velocity) chain drive is said to provide a power-transmitting medium that combines the ruggedness of a gear drive with the smoothness of a belt.

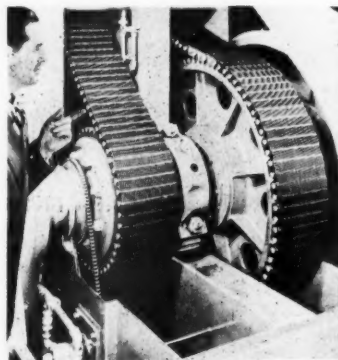
It makes possible single drive units which can transmit 5,000 hp at linear speeds up to 6,500 fpm, or rotative speeds up to 3,600 rpm, says Morse; a Hy-Vo drive 2 inches wide has transmitted 500 hp. According to Morse engineers, the drives can increase efficiency and reduce power-transmission costs in any field where single motors or engines are used in sizes of approximately 100 hp and up.

The new chain-and-sprocket engagement principle is said to virtually eliminate what is known as "chordal" or polygon action of the usual chain drive. The Hy-Vo sprockets resemble involute gears, having curved involute teeth which engage the Hy-Vo links with conjugate action. The chain incorporates a compensating rocking joint with special design features for eliminating slippage and wear. During chain articulation, the joint shifts the pitch line automatically, engaging the involute sprocket teeth in such a way that the chain follows a path truly tangent to the sprocket pitch line, the company states.

Pitch elongation or stretch has been eliminated to the extent where it is virtually unnecessary to provide any means of takeup, Morse claims. Thus the Hy-Vo may be used on drive applications such as engine compounding or heavy-duty power transfers where center adjustment is impractical. Operation is quiet and temperatures are low at all speeds.

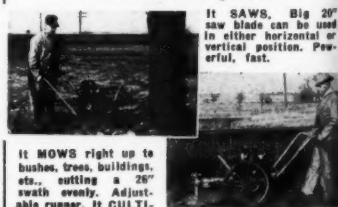
Hy-Vo in no sense replaces present Morse roller or silent chain drives, but supplements them. It is designed specifically for speed applications higher than conventional chain drives, and to replace unwieldy belt drives now required for high-speed power transmission. A 6-inch Hy-Vo drive, for example, is said to do the work of a 24-inch belt.

At present the drives are being produced in 1, 1½, and 2-inch pitches. This range will be expanded; however, current material shortages have made it necessary to restrict orders for the new drive to those with defense or



These two 2-inch-pitch 12-inch-wide HY-VO drives transmit the power needed by a diesel-electric drawworks designed to drill 20,000-foot holes. They made it possible to construct a portable diesel-electric drilling unit of this size. Morse Chain Co. makes them.

The BACHTOLD MOWER with attachments does more jobs



It MOWS right up to bushes, trees, buildings, etc., cutting a 20" swath evenly. Adjustable runner. It CULTIVATES almost any kind of soil.

• Easy starting • Finger-tip control • Portable • Compact • Fully guaranteed • Push-type and self-propelled-type models

BACHTOLD BROTHERS, INC. Forrest, Illinois



**Suspension Bridge Over River Included in Large Project
Constructed by F. H. McGraw & Co.**

A black and white photograph of a large, multi-story industrial building, possibly a power station or factory. The building has a complex, blocky structure with several levels and a prominent chimney on the left side. A large, dark, structural framework, possibly a bridge or a conveyor system, is visible in the foreground, extending across the width of the building. The ground in front of the building appears to be a flat, open area, possibly a parking lot or a construction site. The overall image has a grainy, historical quality.

Naylor Pipe Company, 1270 E. 92nd St., Chicago 19, Ill.
New York Office, 350 Madison Avenue, New York 17, N.Y.

New Eleven-Building Plant Processes Coal

(Continued from preceding page)

heavy crushing machinery.

From the crusher room the coal is fed onto a conveyor belt that brings it to ground level, and then out across the river on the suspension bridge. The bridge is 1,000 feet long, including a 727-foot span between the towers. The latter are built of steel, 127 feet 6 inches high, while the suspension cables are made up of twelve 2-inch-diameter prestressed bridge strands. The vertical clearance is more than 75 feet; elevation of the water is around 750. The steelwork was fabricated and erected by the American Bridge Co. of Ambridge, Pa. Each anchorage contains 1,600 cubic yards of concrete.

Into the Plant

The coal is carried across the bridge on a 60-inch belt that moves at the rate of 600 feet per minute. For protection in cold weather the conveyor is enclosed within a Quonset-type struc-



C. & E. M. Photo

The coal-processing plant has three thickeners—this one, 150 feet in diameter. Coal sludge is discharged from the flume in the center into the thickener tank which is filled with water. As the arm revolves the sludge drops to the bottom; the water slops over the sluice at the outer edge of the tank.

ture 20 feet wide and heated with unit heaters, making the bridge the longest covered span in the world, and probably the only covered suspension bridge. Walkways alongside the belt

are for maintenance workers, or plant-to-mine foot traffic. The conveyor belt from mine to plant is 1,900 feet long. It drops the coal into a secondary crusher building where additional crushing takes place.

From there the coal moves along to the raw-coal building where it is dumped into 16 hoppers. Three dust collectors are installed in this building. Vibrating screens separate the coal into various sizes, and it is then carried along to the primary side of the main building via eight conveyors. Here the processing takes place after which the coal is taken to the blending bins, and from there back to the secondary side of the main building via six conveyors for additional processing. Once more the coal is sent to the blending bins and dropped into the rectangular cells.

From the main building the refuse ascends a long conveyor to a pair of refuse bins. After being deposited there, the material is broken up in a crusher adjoining the bins. Then the refuse moves away on a 2,000-foot conveyor belt to a dump pile at the edge of the plant site. To one side of the refuse bins are three thickeners to remove sludge from the water used in the processing. Two of these concrete structures have 150-foot diameters, while the third is smaller with an 85-foot diameter. Coal sludge is discharged from a suspended flume into the center of the thickener tank which is filled with water. As a radius arm revolves around the tank, the sludge

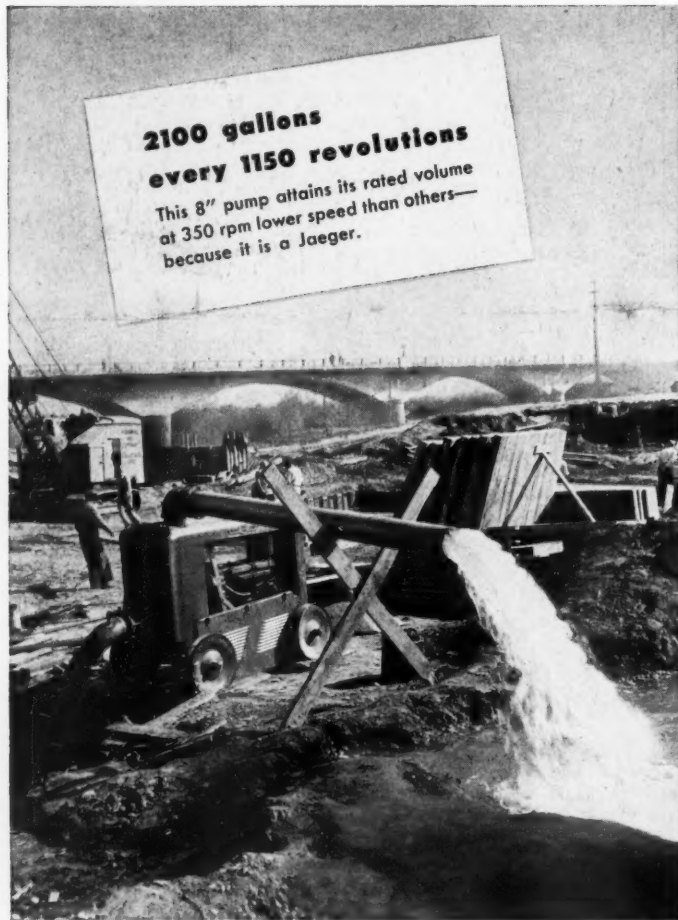
drops to the bottom while the water slops over the sluice at the outer perimeter of the tank. This is a closed system, with water taken from the river for the processing and the impurities removed. After being used it is "cleaned" and returned to the circuit.

Construction Features

One of the first things done by F. H. McGraw & Co. after arriving at the job site was to construct a temporary timber dock in the river. Materials were delivered by barge or via the Monongahela railroad which runs along the rear or east side of the plant. Pennsylvania Railroad tracks are on the opposite shore. Sand and gravel aggregate for the concrete came by way of the river, while Alpha cement was shipped in from Pittsburgh. A batch plant was set up on the site, and four transit mixers delivered the concrete to the forms where it was handled by crane and bucket. The Ingalls Iron

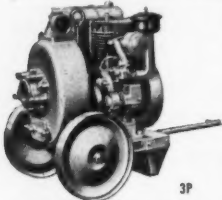
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JAEGERS pull stronger, pump longer



2100 gallons every 1150 revolutions
This 8" pump attains its rated volume at 350 rpm lower speed than others—because it is a Jaeger.

Because Jaeger dewatering pumps are built oversize, to produce full rated volume at easier speeds, they also hold more priming water and are subject to less abrasive wear. Combined with double priming action and positively lubricated seal (Jaeger patents) they insure fast, sure priming without vapor lock on the toughest pulls, sustained efficiency on non-stop pumping, and thousands of extra hours of service from both pumps and engines.



Other sizes 1 1/4" to 10".

See your Jaeger distributor or send for Catalog P-10.

THE JAEGER MACHINE CO.

701 Dublin Ave., Columbus 16, Ohio

COMPRESSORS • MIXERS • HOISTS • TOWERS • PAVING MACHINERY

THE ANSWER TO THE ENGINEER'S PRAYER

BREAKS CONCRETE FASTER

TAMPS BACKFILL BETTER AND FASTER FOR LESS



THE NEW, MORE POWERFUL

MIGHTY "B" MIDGET

Fastest Pneumatic Concrete Breaker and Backfill Tamper. Replaces all the dirt removed after pipe has been laid. Gives you high density compaction. Ready to repave immediately. No temporary paving. No spoil dirt to haul away. Due to high density compaction, requires little asphalt in replacement. Cuts cost of tamping and breaking of concrete many times. Can be worked manually or automatically. 160' Compressor for full capacity or 105' Compressor for 1/2 capacity. For further particulars, see your nearest dealer, or write Department C.

R. P. B. CORPORATION

2751 East 11th Street Los Angeles 23, California



Cut Costs!
with **ONAN** portable **ELECTRIC PLANTS**

Take 'em Anywhere!

Increase your profits by using fast-working, cost-cutting electric tools on every job, even where highline power is not available. Lightweight, sturdy, Onan engine-driven electric plants supply instantly-available power anywhere for lights, drills, saws, pipe-

threaders, planers, spades, tampers, repair-shop tools and other motor-driven equipment. Carry 'em, wheel 'em, or truck 'em right to the spot and plug in for all the power you need. Equipped with carrying handles or dolly-mounted.

Lightweight Air-Cooled Models: A.C.—400 to 3,000 watts. D.C.—750 to 5,000 watts. Heavy-duty models to 35,000 watts.



Write for Free Folder!

D. W. ONAN & SONS, INC.

7470 University Ave. S. E., Minneapolis, Minnesota



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C. & E. M. Photo

George A. Fulton was Project Engineer on the Jones & Laughlin coal-processing plant contract for F. H. McGraw & Co.

Works of Verona, Pa., supplied the structural steel, while the reinforcing steel came from Jones & Laughlin in Pittsburgh.

The main building, 340 x 200 feet, was a structural-steel framework with transite asbestos siding. The refuse and blending bins are of reinforced concrete, and were constructed by the slip-form method. One of the features of the plant is the large amount of conveyor belting that is used; the main 40-inch belt of U. S. rubber, for instance, is 3,864 feet long. The rolls of belting were usually lifted into place by either crawler or truck crane.

A substation was built, and a special line run in from the West Penn Power Co. to serve the plant. There are 632 electric motors required for its operation. The lowest elevation in the plant is 733 at the river pumphouse, where a 10-foot caisson was sunk for the pump intake. In the main building the lowest elevation is 757 where a pump sump is located. The working floor of the structure is at 781.5 elevation.

Materials and Quantities

The following is a list of quantities of materials required to complete the job:

Excavation (not including mine)	75,210 cu. yds.
Forms	492,220 sq. ft.
Reinforcing	2,281,300 lbs.
Concrete	32,300 cu. yds.
Electrical conduit	70 miles
Electrical cable	440 miles
Belting	3.92 miles
Motors	632
Connected horsepower	12,422
Piping	14 miles

Personnel

At the peak of operations an average of 550 were employed in the construction of the coal-processing plant. F. H. McGraw & Co. was represented on the project by George A. Fulton, Project Engineer; and Harry W. Mathews, Superintendent.

Lightweight Aggregates For Refractory Concrete

The merits of Haydite as the prime aggregate for refractory concrete are outlined in a new 8-page booklet prepared by The Carter-Waters Corp., 140 Pennway, Kansas City 8, Mo. The company claims that Haydite aggregate, when mixed in proper proportions with Lumnite cement, produces a concrete which combines the properties of light weight, high crushing strength, low heat conductivity, and fire resistance. Proper mixes, the literature explains, will withstand sustained temperatures up to 2,000 degrees F. The booklet offers a detailed explanation of all of the features, how the aggregate is made, its applications and properties, and recommended mixes.

Carter-Waters also offers a catalog of Haydite concrete blocks designed for use in all types of building. The

catalog illustrates and describes the standard and special-shaped blocks available from the company.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 112.

Concrete-Mixer Catalog

A new catalog on the 16-S Dandie concrete mixer has been released by Kwik-Mix Co., Port Washington, Wis. It describes and illustrates all recent improvements made on the 3-bag-capacity machine.

The mixer has an all-welded heavy-duty frame, coil-spring mounting, cast-steel drum heads with machined roller paths, bevel-edge drum roller shafts which revolve on self-aligning ball bearings mounted in pillow boxes, and a 28-hp gasoline engine. Other major changes incorporated in it include an improved water valve and lever arrangement and a Batchmeter actuating mechanism. The machine is designed for quick field interchange of side

and end discharge.

Schematic drawings listing detailed dimensions are included in the catalog, along with specifications on the extension-track and tower-loader attachments.

This literature on the 16-S Dandie may be obtained from the company, or by using the Request Card at page 16. Circle No. 156.

L. G. Finlay Dies

Lance G. Finlay, former Vice President and director of Raymond Concrete Pile Co., New York City foundation and heavy-construction firm, died recently in Florida. Mr. Finlay joined Raymond in 1911. In 1932 he was elected a director and in 1944 he became Vice President.

Surfa-slick
Patent Applied For

**SELF-HEATING
ASPHALT
SMOOTHING IRON**

Contractors! This lightweight, rugged, simple, time and money saving smoothing iron will pay for itself in a few days use.

No more building and tending fires on your asphalt jobs!



**HOT
IN TEN MINUTES
HOT
ALL DAY LONG**

• RUGGED • ECONOMICAL
• SIMPLE • LABOR SAVING
• SAFE • COMPACT
Dealer inquiries requested.

J. E. WOODS MFG. CO.
1516 First Street
San Fernando, California



... with **DOMAR** Elevating Grader and "Cat" Motor Grader

From 8 in the morning, till 5:30 at night, the John Dieseth Co. gets a load of work done — two 3-foot ditches are cut and graded ... a 30-foot roadway is built up and brought to grade ... 1/4 mile of county trunk road is added to the Cass County, N. D., road system — all in nine big-production hours.

The Fergus Falls, Minnesota, contractor gets this great performance with a team of only two road-building experts — a Domar Elevating Grader and a "Cat" Motor Grader. The Domar opens the cut and casts the material onto the roadway

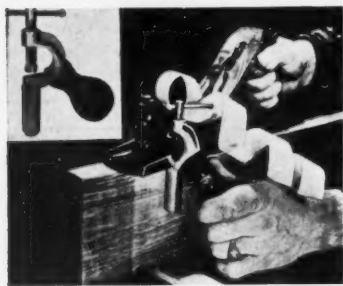
in second gear — finishing cuts are made in third! The grader blades down the heavy gumbo into a finished all-purpose road. And the team works for only 5-6 gallons of fuel an hour!

You can get this same money-making production — in stripping, terracing, loading, casting, road maintenance — with a Domar Elevating Grader. Your Domar "Caterpillar" Dealer can give you full details on this new time-and-money saving attachment for the "Cat" No. 12 and 112 Motor Graders. Stop in and ask him about it — today!

ULRICH PRODUCTS
CORPORATION

ROANOKE, ILLINOIS, U. S. A.

DOMAR



The Square-Ezy plane guide keeps the plane at a right angle to the side of the board being planed, to give a square-edge cut.

Perfect Square Edge With New Plane Guide

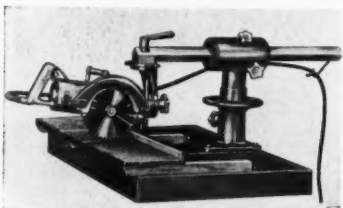
"A perfectly square edge every time" is the claim of Bratton Co., Edwardsville, Kans., for its plane guide, the Square-Ezy. The new device can be attached on the right or left side of any standard plane.

It consists of a clamp with a free-turning cylindrical sleeve which extends below the base of the plane. The sleeve acts as a guide and keeps the plane at a right angle to the side of the board being planed. The attachment has a hardwood knob, for putting sideward and downward pressure on the plane. A uniform bevel can be obtained by adjusting the angle of the plane's blade. Square-Ezy comes in various sizes to fit all planes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 128.

Radial-Saw Support Converts Portables

A new radial support for converting Skil portable saws, Models 77, 87, 800, or 825, into radial saws has been introduced by Skilsaw, Inc., 5033 Elston



Skil portable saws, Models 77, 87, 800, and 825, can be converted into radial saws with the new 175-pound Skil radial support.

Ave., Chicago 30, Ill. Cutoffs, bevel cutoffs, bevel rips, miters, bevel miters, dados, and ploughs can be made easily and precisely, the company claims. On-the-job gang cutting and preforming are possible since the 175-pound Skil radial support can be carried by two men.

An 8½ x 40-inch work table permits pieces to be cut at any angle or bevel up to 45 degrees. The steel arm can be extended 22½ inches horizontally. Maximum vertical adjustment is 6½ inches. The width and depth of cut vary slightly depending upon the saw model used. With Models 77, 800, and 825, pieces up to 18 inches wide can be cut. Vertical depth at 45 degrees varies from 2¾ inches with Model 87 to 1¾ inches with Model 77.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 103.

Bin-Type Retaining Walls

An economical solution to embankment stabilization is offered in a new booklet prepared by Armco Drainage & Metal Products, Inc., Middletown, Ohio. The 16-page illustrated booklet describes how Armco bin-type retaining walls are used and shows how strength plus flexibility is incorporated in their design.

Photographs show how the walls can be installed with a minimum of excavation. Illustrated case histories show where they have been used for embankments along highways, railroads, lakes, streams, and city streets; and on curves and grades.

Copies of this handy reference manual may be obtained from the company, or by using the Request Card at page 16. Circle No. 250.

F. D. Cummer News

The F. D. Cummer & Son Co. has moved to 1827 E. 18th St., Cleveland 14, Ohio. Space has been quadrupled to meet the continuing increase in the volume of business. This move will provide additional space for the enlarged engineering department as well as warehousing facilities to provide immediate delivery of replacement parts for all types of Cummer asphalt plants.

A. W. Bollard, Vice President and Secretary of the company, announces the following assignments: R. N. Bird-sall, Chief Engineer; J. F. Volney, Progress Engineer and Purchasing Agent; E. L. Flasche, Structural Engi-

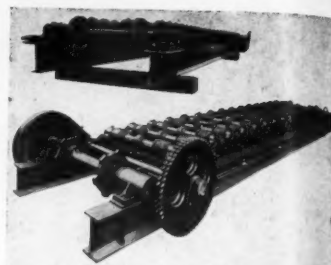
neer and Chief Draftsman; J. R. Black, Assistant to the Vice President; and Evelyn Lee, Office Manager.

J. E. Snider and G. A. Birney, Sales Engineers, are available for consultation on current asphalt plant problems.

Heavy-Duty Feeders Get New Lube System

Two new types of lubricating systems are available on the heavy-duty manganese-steel pan feeders manufactured by Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn.

Both systems use tubing to all bearings for lubricant distribution. In one system, the tubing is brought out to one side of the feeder, and each bearing is lubricated through the Alemite fittings at the end of each tube. In the other system, the tubing is brought out to one side and the tubes terminate in a central system. The bearings are lubricated simultaneously from a pres-



Two new lubricating systems, using tubing to all bearings, are now available on Pioneer-Oro pan feeders.

sure tank.

Previously, each bearing was equipped with an Alemite fitting, requiring separate lubrication at each point. Now purchasers of Pioneer-Oro feeders may select whichever of the three lubricating methods they prefer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 206.

Built for the LONG HAUL!

the RUGGED MILLER

MODEL "B" Tilt-Top

Designed for heavy duty—this tough Tilt-Top provides easy handling of loads up to 10 tons. The all steel frame has tapered side channels 12" deep, braced with 3" deep longitudinal members. The Miller straight through axle is integral with the frame and features 3½" dia. solid steel, stub inserts. Standard platform is 14' x 8', optional 16' available. Platform, tires, Timken bearings, pinion eye and dual Budd wheels are all standard equipment.



IMMEDIATE DELIVERY \$1175

The following equipment is optional and extra. Hydraulic tilt control, two speed winch, electric brakes.

MILLER RESEARCH ENGINEERS

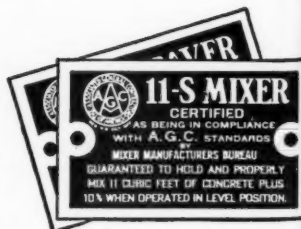
DEPT. C-6, 729 W. BURNHAM ST. MILWAUKEE 4, WIS.



how to get a quick "yes"

Do architects, engineers and contractors know the exact capacity of any standard paver or mixer that pours their jobs today?

The answer is a quick and positive "Yes." Uniform drum sizes have been established and proper mixing capacities guaranteed by AGC Rating Plates. Always look for the AGC Rating Plate when you buy.



Mixer Manufacturers Bureau

Affiliated with the Associated General Contractors of America, Inc.

CHAIN BELT COMPANY
Milwaukee, Wis.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa

THE FOOTE CO., INC.
Nunda, N. Y.

THE JAEGER MACHINE CO.
Columbus, Ohio

THE KNICKERBOCKER CO.
Jackson, Mich.

KOENIG COMPANY
Milwaukee, Wis.

KWIK-MIX COMPANY
Fort Washington, Wis.

THE T. L. SMITH COMPANY
Milwaukee, Wis.

WORTHINGTON PUMP AND MACHINERY CORP.
Construction Equip. Div., Dunellen, N. J.

SAVE UP TO \$586 PER MILE* ON SOIL-CEMENT CONTRACTS!

*Based on 20 ft. road width.

A TWO-MAN TEAM

—plus the Hercules Cement Spreader—makes up complete spreading crew; saves from 2c to 5c per square yard in time, labor, and materials. Couples to any conventional dump truck.



Hercules

HERCULES STEEL PRODUCTS CORP., Dept. 605, Gallon, Ohio
Please send me facts about the Hercules Cement Spreader.

Name _____

Address _____

City _____ State _____

MAIL COUPON

For complete facts about this revolutionary spreader!

Plain Talk Will Win Public Road Support

(Continued from page 3)

In other words, 15 years must elapse before that stretch returns its initial cost. And this figure ignores maintenance costs on the road in that time, and the discrepancy between the rate of Federal gasoline tax and actual Federal Aid payable to the state. Moreover, 15 years comes dangerously close to the expected life of a highway pavement.

If Mr. Motorist knows all this, and sees the figures, will he go on wondering why several thousand miles of state trunk highway in his state have never had a construction job?

Who Is to Tell Him?

Now it's one thing to get the figures down to the level where he can understand them; it's another to get the right group to pass them along to him. The public wants its departments to pub-

lish reports and studies, certainly. It wants the facts about highways. But it does not want to learn those facts the way it learns the advantages of a certain make of automobile or of the whiskey supposed to create "Men of Distinction". It looks askance at costly flamboyant public relations, and it suspects public-relations programs sponsored by industry organizations, such as the ARBA.

One way out of the dilemma, suggested Mr. Law, is to use good-roads organizations wherever they are functioning. Their public membership represents a cross section of the citizenry. "Their value to highway administrators and to highway builders can be remarkably strong because they represent an impartial outside organization willing to praise when praise is due and equally willing to crusade for better performance of the public duty."

Lend such an organization your support, Mr. Law urged. "Provide it with the facts. Work for it and work with it." As for road builders in the 24 states that still do not have such an organization, "become instrumental in organizing one," he suggested. "As highway builders you men are experts in determining whether you should keep the whole contract or sublet part of it." Subletting part of the public-relations job to good-roads associations may relieve us all of a lot of headaches.

Gun-Type Gas Burner

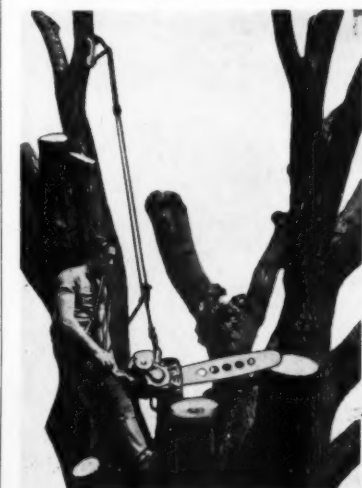
A new inshot gun-type gas burner featuring a balanced flame has been introduced by Delta Heating Corp., 85-07 Northern Blvd., Jackson Heights, N. Y., for use in all types of heating and process boilers, furnaces, and large stoves. Three sizes are available ranging from 80,000 to 300,000 Btu per hour. The burner is especially adaptable for use in wet base boilers with low crown sheets, and as a replacement for oil burners, the manufacturer reports. No combustion chamber or refractory base is required.

The burner can be installed in any type of furnace in a short time. A runner pilot is provided on all sizes so the burner can be lighted from outside the furnace. Fully automatic, the burner can be used with natural, mixed, or manufactured gas. A streamlined cover is available for conversion installation.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 185.

Aerial Saw Carrier

Safety to the operator is said to be the outstanding feature of the new aerial power-saw carrier manufactured by LeRoy Machine Co., Inc., East Main Road, LeRoy, N. Y. It hoists the saw and supports its weight while



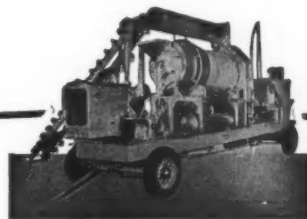
Power saws go aloft easily and safely with the LeRoy aerial saw carrier. It grips the tree and supports the saw when it's in use or when the operator drops it to change his position.

in use. Whether the operator is aloft in a tree or standing on the ground, he works entirely independent of the saw. He may let go of it while he changes position, and it hangs free until he is ready for another cut. It speeds tree trimming, topping, or completely taking down a tree, and is easily handled by one man, the company says.

It consists of a steel plate with sharp-pointed prongs that grip the tree; a crane arm to hold the carrier away from the tree and permit it to swing through a wide arc; a tension

spring attached between the end of the crane arm and the pulley through which the hoisting rope is reeved; a clamp to attach the hoist to the saw; and another hand-operated clamp attached to the hoisting rope to hold and adjust the position of the saw. A flexible cable passing through the center of the spring is said to provide safety in case the spring breaks. The carrier adapts to either gasoline or electric-powered saws.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 192.



Portable Asphalt Plants For City, State, Repairs and Small Contract Work

These 8-10 tons per hour Asphalt Plants economically repair almost any pavement. Asphalt, brick, concrete, macadam, can be resurfaced or patched. Alleys, driveways, sidewalks, industrial plants can be paved. Produce for immediate hot laying, or for deferred cold patching. Match any bituminous surface.

Mixes at plant, including labor, fuel, and overhead, cost about \$4 per ton, with \$2 aggregate. Average 160 to 200 sq. yds. 1" thick per hour. A moneymaker for small contract work. Also larger plants, 15 and 30 tons per hour.

Write for catalog and name of nearest dealer.

Elkhart

White Mfg. Co.

Indiana

**NEXT TIME...
Pull a FAST one!**



Get Rapid, Dependable Action with VULCAN PILE EXTRACTORS

for pulling sheet steel, wood, concrete, H-beam and pipe piles.

Mechanical features engineered on correct principles make Vulcan the fast, modern economical pile extractor. Its parts cannot become disarranged and no assembly is necessary to place it in immediate service. The Vulcan has but one moving part, requires no adjustments, can't get out of order.

Proved since 1927 under both good and bad working conditions, the Vulcan Pile Extractor has justified every claim made for its efficiency, hardness and performance. Three types built to handle every kind of pile extracting job. Write for full details.

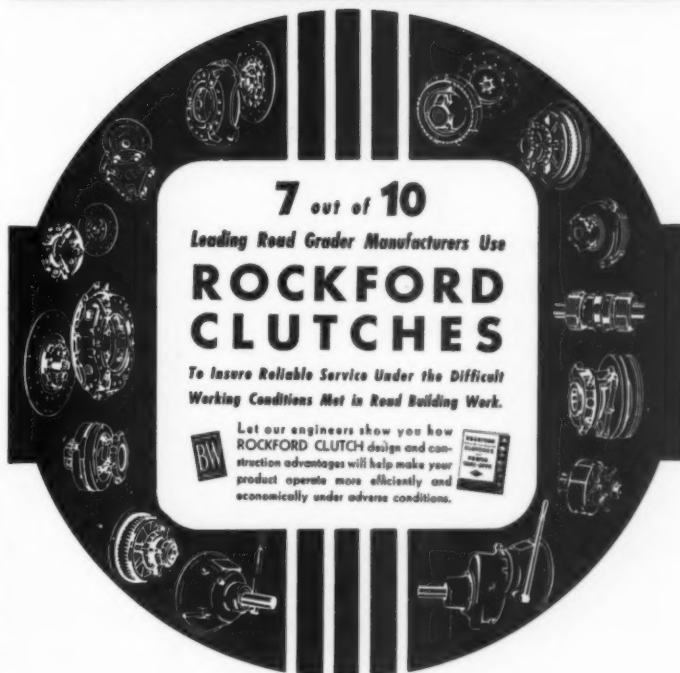
VULCAN IRON WORKS
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CONTROL POWER BETTER



ROCKFORD CLUTCH DIVISION
BORG-WARNER

314 Catherine Street, Rockford, Illinois

**ROCKFORD
CLUTCHES**

Convention Calendar

June 13-16—ASCE Meeting

Summer Convention, American Society of Civil Engineers, Brown Hotel, Louisville, Ky. C. W. Lovell, General Chairman, 418 Oread Road, Louisville, Ky.

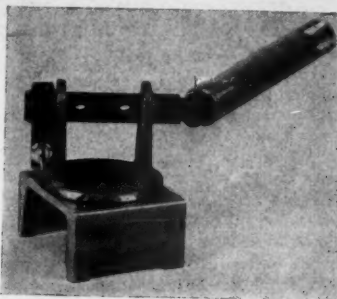
June 18-22—ASTM Meeting

Annual Meeting, American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J. Robert J. Painter, Assistant Secretary, ASTM, 1916 Race St., Philadelphia, Pa.

October 8-14—Pan American Road Congress
Fifth Pan American Highway Congress, Lima, Peru. International Road Federation, 550 Washington Bldg., Washington 5, D. C.

Wilhelm Elected

C. Ray Wilhelm was elected President of the Georgia Concrete Pipe Association recently. Mr. Wilhelm is Plant Manager for the Universal Concrete Pipe Co. in Atlanta.



The Piper form-tying tool stretches and ties wire around the outside of forms within 30 seconds. There is no give to the forms after the ties have been made, the company reports.

Develops New Tool For Wire Form Tying

A new tool for all wire form-tying operations has been developed by Piper Form Tie Co., 3605 N. Missouri, Portland 12, Oreg. The company reports that the wires are stretched and

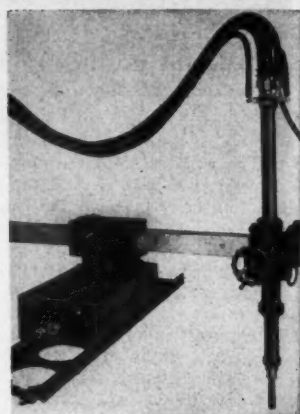
formed around the wales and tied on the outside of the forms within 30 seconds, and in such a manner that there is no give to the forms after the ties have been made. The full strength of the wire is retained, since there is no twisting between the forms.

The Piper form tie is a one-piece assembly unit. It can be removed immediately after the ties have been made. The wire can be pulled from the wall when the form is removed. The tool weighs approximately 1½ pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 168.

Pipe Makers Elect Strickland

D. M. Strickland has been elected President and General Manager of the National Clay Pipe Manufacturers, Inc. He succeeds W. E. Robinson, President of The Robinson Clay Product Co. Mr. Strickland, a chemical engineer, has been Vice President of NCPMI since its organization.



The Airco No. 41 Radiograph—for jobs which require a traveling carriage to carry equipment past the work. It is designed to simplify gas cutting, flame hardening, and welding operations.

New Cutting Machine For Heavy Shop Work

The new Airco No. 41 Radiograph is a motor-driven straight-track-guided machine, designed for shop and mill jobs which require a traveling carriage to carry equipment past the work. Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y., says that this new machine simplifies gas cutting, flame hardening, and welding operations. Used for billet nicking, slab ripping, and skull cutting, the machine will also find application in maintenance shops where flame hardening is used extensively.

The smoothly machined top is designed for solid and level mounting of equipment. Provisions are made for mounting the new Airco plate-edge preparation device, the universal motorized torch arm and holder assembly, and the manual torch arm and holder assembly. Also, automatic welding units such as the Airco automatic Heliweld head and the Aircomatic R-head, which in most cases require a carriage-type machine, can be readily mounted on the new Radiograph.

Features include all-welded construction; accessible self-contained electric panel; insulated bottom plate to protect internal parts from heat; speed ranges from 1 to 72 inches per minute with a standard gear-reduction unit (other speed ranges with special gear-reduction units); and indexed speed control for manual selection of desired speeds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 162.

Protection While Welding

A complete line of safety goggles and welding helmets is illustrated in the new 8-page catalog prepared by Modern Glass Processing Corp., 1541 Schaeffer St., Brooklyn 27, N. Y. Each product is briefly described. Some 20 goggles and 12 safety helmets are included in the booklet, each designed to meet the requirements of a specific job.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 147.



PROVIDE

ALL-WEATHER PROTECTION for MEN, MATERIALS and EQUIPMENT

SISALKRAFT is rugged, easy to handle, economical. Ideal for closing-in, covering materials and equipment, and for curing concrete.

SAMPLES FREE on request . . . write

THE SISALKRAFT CO.
Dept. CE-6 205 W. Wacker Dr., Chicago 6, Ill.
New York 17, N. Y. • San Francisco 5, Calif.

UNIVERSAL Spirolocs

HEAVY DUTY TIES

FASTEST—SAFEST—LOWEST COST



Greater Tie Strength

For less money with Spirolocs

- 5,000# Ties with ¾-Tie Rods
- 9,000# Ties with ¾-Tie Rods
- 14,000# Ties with ¾-Tie Rods
- 20,000# Ties with ¾-Tie Rods

SPIROLOC CONE NUT ASSEMBLY



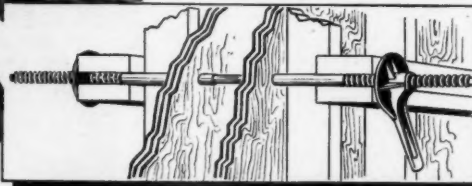
The only fast acting form Tie with an absolutely positive spreader...assures smooth surfaced, watertight walls.

Write for complete details on SPIROLOCS and ask for catalog describing Universal Form Tying Accessories.

UNIVERSAL Spirolocs—heavy duty Form ties...Permanent, reuseable equipment...fast acting Acme threads...washers and stud rods last indefinitely; only inexpensive threaded tie rods expended.

Spirolocs provide fast erection...easy stripping...available in various time-saving combinations to fit the exact needs of your job.

RENTED...SOLD



Spirolocs are Furnished with either Handle or Nut Type Washers



SPIROLOCS IN ACTION

THE NUT WASHER SPIN IT ON

Universal FORM CLAMP CO.

Concrete Form Specialists Since 1912

General Offices and Factory • 1236-38 NORTH KOSTNER • CHICAGO 51, ILLINOIS • CAPITOL 7-1600

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• BALTIMORE, MD.
661 S. Monroe St.

• TAMPA, FLORIDA
4401 W. Cayuga

• DALLAS, TEXAS
2175 W. Commerce St.

• SPRINGFIELD, ILL.
2522 Poplar Ave.

• NEW YORK, N. Y.
51 E. 42nd St.

• SWAMPSCOTT, MASS.
51 Barnstable St.

• HATO REY, PUERTO RICO
Ave. Munoz Rivera 84—Stop 27½

Service Wherever You Build...Coast-to-Coast



Looking over the program of the Kentucky Highway Conference are, from left to right, Hal H. Hale, Executive Secretary of the AASHO; W. P. Curlin, Kentucky Commissioner of Highways; Dean D. V. Terrell, of the University of Kentucky College of Engineering; and T. J. Carmichael, Administrative Engineer of the General Motors Proving Ground. The Conference was held in Frankfort, Ky.

Kentucky Conference Stresses Maintenance

The Third Annual Kentucky Highway Conference in Frankfort, Ky., sponsored by the Kentucky Department of Highways and the University of Kentucky, ended April 6, after two days of talks and discussions which centered on the maintenance of public streets and roads.

In the opening address, W. P. Curlin, Commissioner of the Kentucky Department of Highways, pointed out the damage trucks are doing. He told the 100 delegates that "with heavy legal weights, the constant pounding of illegal trucks, the truck volume, and the steady increase in passenger-car traffic, roads everywhere, not only in Kentucky, face an extended maintenance problem."

Other speakers at the opening session were Hal H. Hale, Executive Secretary of the American Association of State Highway Officials, and T. J. Carmichael, Administrative Engineer, General Motors Proving Ground.

M. F. Johnson, Director of the Kentucky Highway Department's Maintenance Division, and A. O. Neiser, Director of the Division of Design, spoke during the afternoon session on the first day of the conference. Mr. Johnson told delegates that the cost of maintaining the state's network of roads and highways could be reduced only by replacing or thoroughly reconditioning any obsolete and overloaded portions of the system. And Mr. Neiser pointed out the advisability of designing roads or predicted rather than for actual traffic.

At the Thursday luncheon, Kentucky's Governor Lawrence W. Wetherby told the delegates that he was sure the highway Department could take care of both principal and rural roads under the present tax setup. He stressed the importance of a good rural road program.

University of Kentucky Dean of Students, A. D. Kirwan, who also spoke at the luncheon, told delegates that the university laboratories are at present engaged in projects which are related to national defense.

Professor Ben H. Petty of Purdue University gave an address on highway building at a dinner held Thursday night.

Speakers at the closing session were W. W. Sanders, Chief Engineer of the Louisville Department of Public Works; L. E. Akers, Secondary Roads Engineer for the Virginia Department of Highways; and J. H. Havens and A. C. Peed, Jr., of the Kentucky Department of Highways.

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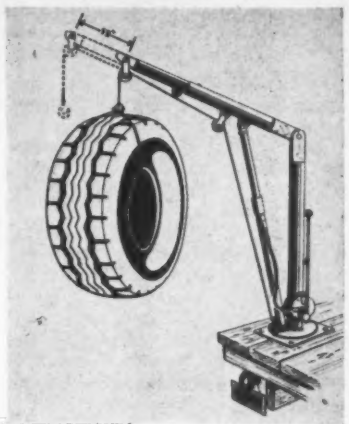
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Extension Increases Load Travel of Hoist

A 12-inch boom extension which increases the load travel of the Unit utility hoist from 77½ to 97½ inches has been announced by Unit Mfg. Co., 1229 Harmon Place, Minneapolis 3, Minn. The increase in load movement permits operations such as setting pipe, working in manholes, setting water hydrants, and reaching over obstructions. The Unit utility hoist is fully hydraulic in operation, and its design is said to permit quick transfer from truck bed to floor frame for shop use.

An optional sheave attachment increases load travel an additional 25 per cent. Lifting is done by a wire cable which is secured to a clevis attached to the lower end of the hydraulic cylinder and run through a sheave at the boom end. Special widths of floor frames are also available for applications which require extra clearance.

Further information on the Unit



A 12-inch boom extension increases the load travel of the Unit utility hoist from 77½ to 97½ inches.

utility hoist may be secured from the company. Or use the Request Card at page 16. Circle No. 118.

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time, money

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The POWER Scythe

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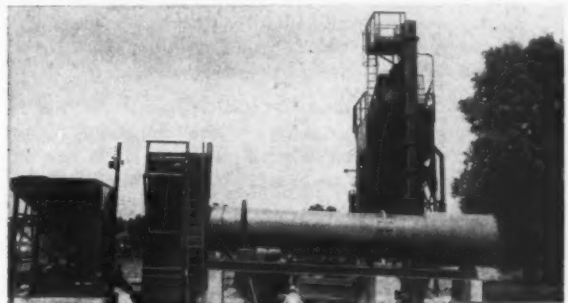
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New Portable Tools; Drills and Sanders

Four new tools have been added to the line manufactured by Cummins Portable Tools, Division of Cummins-Chicago Corp., 4740 N. Ravenswood Ave., Chicago 40, Ill. These include two standard-duty drills and two portable disk sanders.

The Model 430 drills 5/16 inch in metal, 3/4 inch in hard wood. Its no-load speed is 1,000 rpm. It is equipped with a Jacobs geared chuck, Model 30B. The drill measures 12 3/4 inches over-all and weighs 6 1/2 pounds. The Model 435 drills 3/8 inch in metal, 3/4 inch in hard wood. Its no-load speed is 750 rpm. It is equipped with a Jacobs geared chuck, Model 32B. Its length is 13 1/4 inches and weight is 6 1/2 pounds. Both drills have a universal motor for ac or dc operation on 60-cycle 115-volt current (220 volts special). They also feature ball and roller bearings; double-reduction helical-cut gears; a 2-pole switch with



The Model 430 standard-duty drill is one of four new tools brought out by Cummins. It drills 5/16 inch in metal and 3/4 inch in wood.

momentary contact; die-cast aluminum frame; and a 10-foot 3-conductor cord with rubber plug and pigtail for ground.

The Model 460 sander has a 7-inch backing pad. It is 18 inches in length over-all, not including pad, and weighs 14 pounds. The Model 465 sander has a 9-inch backing pad, measures 18 inches without pad, and weighs 14 3/4 pounds. Both models have a cast-

aluminum frame and a 3/4-hp universal-type motor for ac or dc current at 115 volts standard (220 volts special). Other features include precision-cut gears; sealed ball bearings throughout; a no-load speed of 4,200 rpm; a totally enclosed switch of the double-pole toggle type; a 5/8-inch spindle diameter with an 11-thread gear-locking pin for quick disk change and a detachable handle for right or left-side mounting; and a 7-foot 3-conductor cord.

Further information on these tools may be secured from the company. Or use the Request Card at page 16. Circle No. 135 for information on the drills, and circle No. 178 for information on the sanders.

New Valves Announced

Worm and gear-operated valves have been added to the line of Homestead-Reiser lubricated plug valves made by Homestead Valve Mfg. Co., P. O. Box 550, Coraopolis, Pa.

Identified as Figure 502 GW, the new valves have the patented Self-Seal construction and a port area equivalent to 100 per cent of the area of standard pipe. They are cast in semisteel and made in 8, 10, and 12-inch sizes. They will soon be available in cast-steel full-port type to be known as Figure 562 GW, and in venturi-type sizes up to 14 inches. The venturi-type valves will have face-to-face dimensions identical to those of like-sized Series 15 wedge-gate valves. They will be designated Figure 512 GW for semisteel and Figure 572 GW for steel.

Full details may be had by requesting Reference Book 39-5. Or use the Request Card at page 16. Circle No. 153.



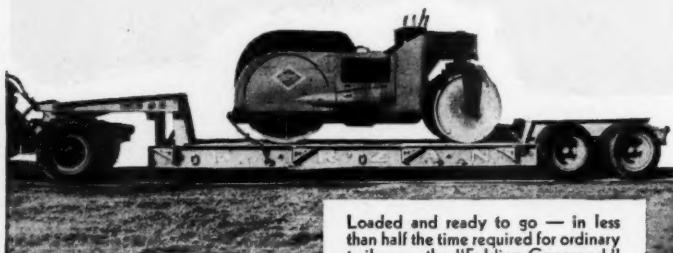
Short length and width and a narrow turning radius feature Buda's new 2,000-pound-capacity fork-lift trucks. Five standard masts are available.

One-Ton Lift Trucks

Short length and width and a narrow turning radius are features of the new 2,000-pound-capacity fork-lift trucks now manufactured by The Buda Co., Harvey, Ill. Available in a 24 and a 15-inch load center, Buda Models FB20-24 and FB20-15 also incorporate improvements in safety, comfort, and operating features. A new-design single gear-shift lever mounted on the steering column, a full-vision front instrument panel with a complete set of gauges, and a 9 1/4-inch-diameter clutch replaceable in 30 minutes without removing the transmission, are other features.

The trucks are powered by a 4-cylinder 61-cubic-inch-displacement engine and are available in five standard masts with a lift of 72, 84, 108, 114, and 120 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 221.



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Loaded and ready to go — in less than half the time required for ordinary trailers — the "Folding Gooseneck" provides greater clearance for viaducts, wires and other obstructions... allows faster, safer travel.

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Charles Mascali says, "The faster loading of the Martin Trailer, plus the labor-saving, one-man operation, led us to select it for our equipment-moving work. It also saves the cost of skids and blocking."

Moving heavy equipment through crowded city streets... loading and unloading in narrow confines... insuring pedestrian safety... keeping costs low—these are the problems that contractors working in large cities must meet. These are the problems that Frank Mascali & Son, Inc., L.I., New York met with a Martin "Folding Gooseneck" Trailer!

The Martin "Folding Gooseneck" Trailer can answer your moving problems—on city streets or on back-country trails. Your Martin "Caterpillar" Dealer can show you its amazing operation... its cost-cutting features. Call on him—today!

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The Martin "Folding Gooseneck" unfolds to form its own gentle ramp. There's no dangerous blocking—no winching of low-traction units, such as this roller. Loading or unloading is accomplished by one man!

MARTIN

Trailers

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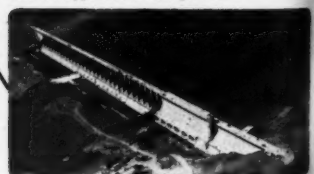
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Veterans Administration Hospital, Wilmington, Delaware, has a structural frame of Darex AEA concrete. Darex AEA made possible low slump concrete in heavily reinforced walls and slabs, with no appreciable honeycomb.



In the Fort Gibson Dam, Grand River, Oklahoma, Darex AEA concrete was used because of its increased workability, greater resistance to freezing and thawing.



Darex AEA is used to increase production and improve quality of concrete blocks, cast stone, concrete pipe, lightweight concrete products, pre-cast cribbing and curbing.



The Mystic River Bridge, Boston, was paved with Darex AEA concrete to increase resistance of pavement to freezing, thawing, and de-icing salt action.

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Health Group Asked To Aid Reclamation

Reclamation Development Tied Closely to Nation's Health, Day Explains to Medical Convention

• SILT and politics, both man-made, are the two worst problems of reclamation engineers. Unless the encroachment of both is reversed, the future of western irrigation and the nation's health stand in danger.

So said Raymond P. Day, Western Editor of *CONTRACTORS AND ENGINEERS MONTHLY*, as he addressed a joint session of the American Academy of Applied Nutrition and the American Anti-Arthritis Association, April 15, at the Hotel del Coronado, Coronado, Calif. The two medical groups were holding their 15th and 6th annual sessions, respectively, to explore the possibility of preventive nutrition and human health.

A billion acre-feet of the nation's water resources still waste to the oceans, Day explained, and the accelerated tillage of land is causing excessive soil erosion and silting of irrigation and flood-control works. Around these two factors he built a strong case for sounder reclamation in the future, and for better agriculture now. The reclamation task has only begun, Day said, but it needs some restraints if it is to best serve the country's interests.

Pinpointing "gaps" in reclamation, the speaker said he doubted whether the ultimate in Government-produced

hydroelectric power was a sound approach to the optimum use of water resources. The emphasis in reclamation of land is usually on acreage instead of productivity or nutritive crop value, he said, and too little thought is being given to ground-cover characteristics, silting, future atomic-power possibilities, or artificial weather modification.

More and more reclamation projects are being subsidized by nonreimbursable financing as the projects grow bigger and more complex, he added, and the time may be near at hand when reclamation should face the test of private financing. This would weed out marginal or luxury projects which today would be a drain on the economy, but might be justified 50 years from now.

Warning that the nation's best dam sites are rapidly being covered by irrigation and flood-control works, Day urged that every possible farming effort be made at once to safeguard vital investments already made. There must be a greatly accelerated movement toward sounder and more independent agriculture that can "stand on its own feet", and the upper watersheds must be protected by improved forestry and the construction of small but vital detention reservoirs, Day explained.

Calling for a reversal of paternalism in Government-financed reclamation, Day told the medical and agricultural delegates that it could come about only if farmers convinced themselves that profitable agriculture and human health go hand in hand. More research in the practical economics of farming and more agricultural idealism are needed, he said, as he expressed the hope that this research would soon lead to a mighty new movement by individual farmers to tie down their soil and water and use it to grow more nutritive crops.

Defends Private Power

Not all hydroelectric power in this country can be credited to Government-built Coulee Dams, Day said as he told how private enterprise has met the power challenge since VJ-Day. The Pacific Gas & Electric Co. alone has brought in 7 new powerhouses and built two 402,000-hp steam plants, and private companies have invested over \$9,000,000,000 in public utilities since

the end of World War II. Private utility companies all over the nation are stepping up their operations, he said, and their showing compares favorably with tax-free, competitive Government projects. A large percentage of all heavy-construction volume still belongs to private enterprise investments, Day concluded.

Dedicated to the improvement of public health through better nutrition, both the AAAN and the AAAA groups are becoming interested in engineering and construction developments which affect the health levels all over the nation.

News from Good Roads Assn.

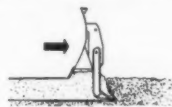
William F. Duffy was made Executive Secretary of the New York Good Roads Association recently. He was formerly Director of Membership for this group. Charles H. Sells has resigned as Executive Director and Robert J. Shillinglaw has resigned as Director of Public Relations.

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When tractor moves forward, teeth drop on top of ground. No controls are required.



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Preco Back-Rippers have been in use for the past three years by many well-known contracting firms. They save time and have replaced other equipment in building pioneer roads, clearing land and rights-of-way, in gravel pit operations, slate breaking in coal strip mines, mounted on pusher tractors for scraper loading, for logging operations and many other uses. Quickly installed on most straight blade bulldozers.

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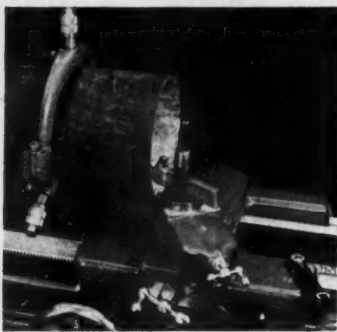
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The steady-rest locks a 10-inch pipe in position for machining on a 16-inch South Bend lathe.

Lathe Steady-Rest

A new steady-rest for mounting large work in a lathe has been announced by South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind. Available for 16 and 16 to 24-inch lathes, this steady-rest takes work be-

tween 4 3/4 and 10 3/4 inches in diameter. It is especially suited for machining pipe, pressure cylinders, pump and engine cylinders, and similar work.

It incorporates a compound-thread jaw-actuating mechanism. Each jaw is moved in or out by turning a large knurled knob, and is locked in the required position by a thumb screw. The steady-rest top is hinged for easy mounting and removing of the work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 141.

Cummins Engine Co. News

Charles C. Sons is now Acting Eastern Service Manager for Cummins Engine Co., Inc., Columbus, Ind. He replaces Dillard B. Davis, now Regional Service Representative in the central region. Lloyd Kerber, who held this job until recently, resigned to accept the position of General Service Manager for Cummins Diesel Sales Corp. of Missouri, at St. Louis.

Canada's First Subway

Photo courtesy of Atlas Polar Company Limited, Toronto



WAUKESHA POWER Pushes Toronto's New Rapid Transit

● A hole in the ground today—Canada's first subway tomorrow! Because Waukeshas are at work—here at Yonge and Front Streets, where the contractors—Pitts, Johnson, Drake & Perini; and Rayner Construction Company—are building Toronto's rapid transit subway.

You'll find Lorain Moto-Cranes and shovels, Canadian Ingersoll-Rand Compressors, and other power machines—with Waukesha Engines. Actual count showed that more than half of the engines powering construction equipment on the job at the time were Waukesha Engines. Many of the trucks hauling earth from the excavation had Waukesha Engines, too.

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WAUKESHA POWER

Rubber Gasket for RC Pipe

Engineering specifications for the use of Hexseal rubber gaskets with reinforced-concrete sewer pipe are contained in a new brochure put out by Universal Concrete Pipe Co., 297 S. High St., Columbus, Ohio. The text and drawings cover type of pipe, dimensions, pipe design, steel reinforcement, concrete, water curing, steam curing,

curing compounds, and curves. A special section discusses installation.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 181.

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Gold Foundry & Machine Works	61	Texas Co.	3, 12, 13
Goodyear Tire & Rubber Co.	5	Thew Shovel Co.	9, 10
Grace Mfg. Co., W. E.	33	Timken Roller Bearing Co.	47
Greyhound Arc Welder Corp.	25	Thurman Scale Division	27
Griffin Wellpoint Corp.	73	Tractomotive Corp.	59
Gulf Oil Corp.	51	Transport Trailers, Inc.	41
Guth Co.	34		
Harnischfeger Corp.	33		
Hayward Co.	48	Ulrich Products Corp.	99
Hendrix Mfg. Co., Inc.	48	Unit Crane & Shovel Corp.	50
Henry Mfg. Co., Inc.	47	United States Rubber Co.	71
Hensley Equipment Co.	71	Universal Atlas Cement Co.	7
Hercules Steel Products Corp.	100	Universal Form Clamp Co.	102
Hoffco, Inc.	103		
Hopkins' Volcanic Specialties, Inc.	96		
Horn Co., Inc., A. C.	35	Van Brush Mfg. Co.	103
Hough Co., Frank G.	30	Viber Co.	8
Huber Mfg. Co.	58	Vibro-Plus Products, Inc.	67
		Vulcan Iron Works	101
		Vulcan Tool Mfg. Co.	39
Insley Mfg. Corp.	23		
International Harvester Co.	82, 83		
Interstate Rubber Products Corp.	68		
Irrington Form & Tank Corp.	76		
Jackson Mfg. Co.	97	Waukesha Motor Co.	106
Jaeger Machine Co.	98	Weil & Co., J. H.	103
Joy Mfg. Co.	46	Wellman Engineering Co.	75
		White Mfg. Co.	101
		Whitestown Trencher Co., Inc.	81
		Wickwire Spencer Steel Div., Colorado	
		Fuel & Iron Corp.	41
		Winpower Mfg. Co.	93
		Winslow Scale Co.	26
		Wisconsin Motor Corp.	78
		Woods Mfg. Co., J. E.	99
		Worthington Pump & Machinery Corp.	
		Construction Equipment Div.	12

1 **TOURNADOZER** replaces two crawlers



Shuttles between 2 jobs...12 miles apart

As an example of Tournadozer's ability to save time and trouble on scattered assignments common in county dozing and road maintenance applications, you will be interested in the performance record shown below . . .

William J. Muehlenbeck Excavating Co. of Saginaw, Michigan, landed an airport drainage contract at Pontiac at the same time as they started widening and re-grading U.S. 24 north of Detroit. Although the two jobs were 12 miles apart, contractor's rubber-tired C Tournadozer handled the dozer work at both spots . . . replacing one crawler-type rig on the 75,000-yd. highway, and eliminating another crawler dozer at the airport.

12 pay yards in 1/2 minute

On the road job, Tournadozer push-loaded 3 self-propelled scrapers . . . helping them get 12 to 15 pay yards of packed topsoil, clay and sand in 30 to 60 seconds. Loading distance varied from 50 to 100 ft. . . number of loads heaped into the 3 scrapers, from 24 to 30 hourly.

When accumulated backfilling called for dozing at the airport, scrapers worked their long-haul dirt with a crawler-pusher . . . while Tournadozer highballed over main highways to Pontiac, where it backfilled around 18" and 24" drainage tiles. As soon as this task was done, the 19 m.p.h. "C" returned to Rt. 24 to take up the push-loading assignment again.

96% efficient on all work

Whenever necessary, Tournadozer also cleared brush, removed stumps, and prepared entrance roads. On all work, over the course of both jobs, Owner Muehlenbeck reports that his "C" operated at 96% efficiency.

Another advantage of the C Tournadozer for county application is its proved ability to lick the toughest snow conditions with a special V-type plow. Ask your LeTourneau Distributor for full information on county dozing and plowing service. Why not call him, or write TODAY!

D Tournapull used as a finishing tool on sub-grade for U.S. 24

While 3 larger-capacity scraper units handled most of the heavy grading on U.S. 24, Muehlenbeck's self-loading, 28 m.p.h. D Roadster Tournapull provided him with a high-speed, low-cost method of finishing sub-grade, for ditching and backslopes. "Our Roadster proved ideal for ditching and fine-grading," says Supt. Stanley Davis . . . "good on both long and short hauls."



Tournapull, Tournadozer—Trademark Reg. U.S. Pat. Off. R2293



R. G. LeTOURNEAU, INC. Peoria, Illinois

HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

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